

## APPENDIX B. Directory of OSS E/PO Programs

This directory provides overview information on the overall Education and Public Outreach (E/PO) program activities of each Office of Space Science (OSS) mission or program. (A list of mission/program acronyms is provided in appendix I.) Each listing contains the following information:

**Title:**

Title of the mission or program.

**Description:**

Overview description of the E/PO activities conducted by the mission or program.

**Lead:**

Person or organization with lead E/PO responsibility for the mission or program.

**Contact:**

Person or organization with contact E/PO responsibility for the mission or program.

**URL:**

Web address for further information on the mission or program's E/PO activities.

**Activities (or Grants):**

Indexed listing of all E/PO products and activities conducted or supported by the mission' or program (or of all active E/PO grants supported by the program).

The listings are grouped into categories as follows:

**Office of Space Science**

- Grants Programs
- Major Partnerships

**Education and Public Outreach (E/PO) Support Network**

- Forums
- Broker/Facilitators

**Astronomical Search for Origins (ASO) Missions**

- Major Missions
- Explorers
- Navigator
- Other NASA Programs

**Solar System Exploration (SSE) Missions**

- Major Missions
- Discovery
- Mars Exploration Program
- Outer Planets Program
- Other NASA Programs
- International Missions with NASA Participation

**Structure and Evolution of the Universe (SEU)**

**Missions**

- Major Missions
- Explorers
- Attached Payloads
- Other NASA Programs
- International Missions with NASA Participation

**Sun-Earth Connection (SEC) Missions**

- Major Missions
- Explorers
- International Solar-Terrestrial Physics (ISTP)
- Solar Terrestrial Probes (STP)
- Other NASA Programs
- International Missions with NASA Participation

## OFFICE OF SPACE SCIENCE

### Grants Programs

#### B1. Initiative to Develop Education through Astronomy and Space Science (IDEAS)

**Description:** The IDEAS Grant Program is one component of NASA's Space Science E/PO Strategy. The program is administered by the Space Telescope Science Institute (STScI) on behalf of NASA OSS. As part of the overall Space Science E/PO program, the IDEAS Grant Program provides start-up funding for innovative, creative education and public outreach projects that feature active collaboration between astronomers/space scientists and formal education/informal education professionals. Through this effort, the IDEAS objective is to enhance science, mathematics and/or technology education in the United States for K–14 students, teachers and the general public by promoting partnerships that explore new ways to translate astronomy and space science into contexts that will educate and stimulate the interest of students, teachers and the general public. There is a formal panel review of all accepted IDEAS grant program proposals. Each team provides an assessment of the group of proposals assigned as well as recommendations for funding. Based on the team's information, the allocation committee at STScI makes final awards. For IDEAS 2001, the program drew 53 proposal submissions from 25 states and 1 U.S. territory. Thirteen proposals were accepted for funding. A two-phased retrospective of the IDEAS Grant Program took place between July 2002 through September 2003. In Phase 1, an external panel concluded that the processes used by the IDEAS Grant Program were designed to be effective and efficient, and IDEAS had evolved to become a national model. The panel also reaffirmed that the IDEAS Grant Program played a role within the context of NASA Space Science E/PO goals and objectives. Furthermore, the panel agreed that IDEAS was useful as a test-bed for innovative projects that fall outside other NASA science-driven education and public outreach funding opportunities.

**Contact:** Ms. Heather Bradbury, Space Telescope Science Institute, OPO Formal Education, 3700 San Martin Drive, Baltimore, MD 21218. E-mail: hbradbur@stsci.edu. Phone: 410-338-4968.

**URL:** <http://ideas.stsci.edu>

**Grant(s):** "Alien Rescue": Problem-Based Learning in Astronomy [A166]  
 Astronomy and the Solar System [A167]  
 "Astronomy-in-a-Box": Hands-on Space Science Resource Kit for Grades 5-8 [A107]  
 Incorporation of Scientific Ballooning in Science Education [A267]  
 Informal Study of the Solar System Through an Interactive Show for Elementary School Children [A108]  
 Model-Building: An Instructional Activity for Interpreting Remotely Sensed Image Data [A109]  
 "Rocket into the Aurora": A Webcast in Observing Auroral Activity [A268]  
 "Solar System Spacecraft Exploration": Real- and Other-World Applications of Math, Science, and Technology [A168]  
 "Students Teaching Students": High School Students as Astronomy Teachers [A269]  
 "The Stargazer" [A3]  
 National Society of Black Physicists Annual Convention [A72]

#### B2. Minority Institution Initiative (MI Initiative)

**Description:** OSS and Office of Education Minority University Education and Research Partnership Initiative in Space Science is a grant program with the long-term goals of enhancing minority college and university participation in space science and increasing the understanding of science, technology, and the role of research in contemporary society in a broad and diverse segment of the American population. It emphasizes partnerships among OSS, the space science research community, and minority institutions. During FY 2003, 15 projects were funded under this initiative, including 6 at Historically Black Colleges or Universities, 3 at Hispanic-Serving Institutions, 3 at Tribal Colleges, and 3 at other minority institutions. Collectively, they were engaged in research collaborations with 10 NASA space science missions or suborbital projects and more than 50 working partnerships with major space science research groups. In academic programs, they established on their campuses 25 new or redirected space science faculty positions, 11 new or revised space science degree programs, and 67 new or revised space science courses. They also engaged in a wide variety of teacher training, precollege outreach, and public outreach programs that serve constituencies in their local communities.

**Lead:** Dr. Philip Sakimoto, NASA Office of Space Science, Code SB, Washington, DC 20546.  
 E-mail: [phil.sakimoto@hq.nasa.gov](mailto:phil.sakimoto@hq.nasa.gov). Phone: 202-358-0949.

**Grant(s):** An Urban Outreach Program in Space Science: A Collaborative Effort Between NASA, Hispanic-serving and Black Universities, and School-age Minority Students [A44]  
 Astronomy and Astrophysics Course Development at Salish Kootenai College [A45]

Collision Processes in Astrophysical Plasmas [A46]  
 Connecting Sun City with Sun-Earth Connections [A47]  
 Enhancement of the Space Science Research Program at South Carolina State University [A48]  
 NASA-HBCU Partnership to Enhance Minority Education and Research Participation in the Space Sciences [A49]  
 New Opportunities Through Minority Initiatives in Space Science [A50]  
 New York City Space Science Research Alliance [A51]  
 Partnerships in Astronomy and Astrophysics Education and Research at Southern University [A52]  
 SMARTT: Scientists Mentoring Astronomy Research Teams of Tomorrow. [A53]  
 South-West Internet Program for the Enhancement of Minority Education [A54]  
 Space Science Curriculum at Hampton University: Development of a Minor, Faculty-Enhancement, and K-14 Outreach [A55]  
 Space Science Education and Sun-Earth Connection [A56]  
 Stars on Earth: Providing Underrepresented New Mexico High School Students with Research Experience in Space Science and Preparation for Math, Science, and Technology [A57]  
 York College Observatory Educational Outreach Program (YC00P) [A58]

### B3. Supporting Research and Technology (SRT)

**Description:** The NASA OSS SRT Program provides grants for basic research and instrument development and data analysis for OSS missions. Each grantee also has the opportunity to propose a supplementary E/PO project to be conducted in conjunction with the research project. The outcomes of the funded E/PO projects are reported here.

**Lead:** Dr. Larry Cooper, NASA Office of Space Science, NASA Headquarters, Washington, DC 20546. E-mail: [Larry.P.Cooper@nasa.gov](mailto:Larry.P.Cooper@nasa.gov). Phone: 202-358-1531.

**URL:** <http://space.science.nasa.gov/education/scientists/index.htm>

**Grant(s):** "A Tale of Two Deserts": Training Educators to Understand Water-Formed Features in the Desert Southwest and on Mars Using Image-Based Exercises [A219]  
 Astrobiology and Life Detection Institute for Informal Educators [A22]  
 "Astronomy Spectrum of the Week": A Dynamic, Online Database for Astrophysical Spectroscopy [A340]  
 Auroral Structure and Dynamics [A23]  
 "Breaking the Secret Code of Starlight" [A244]  
 "Build Your Own Planet": Development of Origins-Based Grade 6 Science Units [A222]  
 Cosmology as a Thematic Approach to High School Physics [A224]  
 Exploring the Martian Surface with a Robotic Rover at the Sciencenter Computer Clubhouse [A255]  
 "Galactic Cosmic Rays: High-Energy Matter from the Milky Way" [A258]  
 Hands-On Astronomy for Teachers [A163]  
 "Hotter Than Blue: False Color Images from the Universe" [A24]  
 "How Astronomers Use Spectra to Learn About the Sun and Other Stars" [A100]  
 Imaging Neptune [A272]  
 "Introducing the Heliosphere: From the Kitchen Sink to the Edge of the Solar Wind" [A15]  
 "Living in the Universe—Points of View" [A229]  
 Lunar Exploration from a Virtual Moon Base [A275]  
 Mars Exploration: Visions from Current and Recent NASA Missions [A29]  
 "Mars in the Southwest": A Teaching Exhibit for Schoolchildren and the General Public [A16]  
 Mars Odyssey E/PO for the OSS Participating Scientist Program: Gamma-Ray and Neutron Spectrometer "MSXcellent!" [A35]  
 National Center for Atmospheric Research High-Altitude Observatory: Teachers-in-Residence Program for K-12 Outreach [A182]  
 NIGHTGLOW, NASA, and Amateur Radio Talk [A405]  
 NIGHTGLOW: Classroom Talk [A299]  
 NIGHTGLOW: Hangar Tour [A300]  
 NIGHTGLOW: Student Support [A301]  
 NIGHTGLOW: Support of PREP Student Balloon Launch [A302]  
 Patterns, Cycles, and Change: The Dynamic Interstellar Medium [A18]  
 Polar Mesospheric Clouds in the Classroom [A303]  
 "Rocks from Space": Teacher Workshops [A192]  
 Science Education Gateway/National Virtual Observatory [A414]  
 Solar Wind Activities for the Los Alamos Space Science Outreach Program [A196]

Space Science Education at the University of Wisconsin [A474]  
 Sun-Earth Connection: Presentation and Inquiry Resources for Scientists in K–12 Classrooms [A237]  
 “Teachers Touch the Sky”: Hands-on Workshop in Space Science [A209]  
 “The Great Desert”: Geology and Life on Mars and in the Southwest [A211]  
 The Student Space Program: Collaborative Learning through Virtual Mission Design [A130]  
 Utah State University: Space Science for Student Teachers and Outreach [A216]  
 “Visualizing the Interplanetary Environment of the Heliosphere and Solar System, and Interactions with  
 Interstellar Matter” [A43]

#### **B4. University Research Centers at Minority Institutions (URC)**

**Description:** The URCs at minority institutions is an Office of Education managed program that is intended to achieve a broadly based, competitive aerospace research capability at Historically Black Colleges and Universities (HBCUs) and Other Minority Universities (OMUs) that will: (1) expand the nation’s base for aerospace research and development, (2) foster new aerospace science and technology concepts, (3) develop mechanisms for increased participation by faculty and students of HBCUs and OMUs in the research programs of NASA’s science and technology Enterprises, and (4) increase the numbers of underrepresented minorities at HBCUs and OMUs who attain advanced degrees in NASA-related fields. Each URC is a multidisciplinary scientific or engineering research center at the host university that contributes to the research program of one or more of the NASA Strategic Enterprises. The Office of Space Science provides funding and technical support to URCs that are working in space science areas.

**Lead:** Dr. Jeffrey Rosendhal, NASA Office of Space Science, Code S, Washington, DC 20546. E-mail: [jeffrey.rosendhal@hq.nasa.gov](mailto:jeffrey.rosendhal@hq.nasa.gov). Phone: 202-358-2470.

**Grant(s):** Center for Automated Space Science [A59]  
 Center for Gravitational Wave Astronomy [A60]  
 National Society of Black Physicists Annual Convention [A72]

### **Major Partnerships**

#### **B5. Adler Center for Space Science Education**

**Description:** The Center for Space Science Education at the Adler Planetarium and Astronomy Museum serves as a nexus between the research and education communities. Its goal is to bring a broad program of astronomy and space science education to the half million annual visitors to the museum and reach beyond the traditional museum setting to provide educational support for students, teachers, and families.

**Lead:** Dr. Paul Knappenberger, Adler Planetarium and Astronomy Museum, 1300 S. Lake Shore Drive, Chicago, IL 60605. E-mail: [paul@adlernet.org](mailto:paul@adlernet.org). Phone: 312-322-0325.

**URL:** <http://www.adlerplanetarium.org>

**Activities:** Adler After School [A240]  
 Far Out Friday [A362]  
 “Goodbye to Galileo” Coverage [A369]  
 International Space Station Audio/Video Contact Event [A377]  
 MER Launch Coverage [A389]  
 Observing Events/MER Updates [A406]  
 Saturn Observing Campaign [A412]  
 “To Mars with MER” [A455]

#### **B6. Challenger Center for Space Science Education**

**Description:** Challenger Center for Space Science Education is a global, not-for-profit education organization. Our mission is to use the excitement of space exploration as a theme to create positive learning experiences that raise students’ expectation of success; foster in them a long-term interest in mathematics, science, and technology; and help them develop critical communication, decisionmaking, and team-building skills. Challenger Center works to develop and maintain a scientifically literate world where every individual has a reasonable understanding of science, mathematics, and technology—and the role they play in our lives. During the past 17 years, Challenger Center has proven its commitment to education through a wide variety of innovative educational programs. Each program is designed to help improve math and science scores. Challenger Center employs three astrophysicists who work as both educators and researchers. As researchers, they work part-time focusing on their individual research interests. As educators, they serve as science content reviewers and writers, workshop leaders, featured speakers, and speakers in the classroom and in other venues. Challenger

Center's staff scientists reach thousands of educators, students, parents, and members of the general public each year. "Window on the Universe" and "Voyage: A Journey Through Our Solar System" are two of Challenger Center's E/PO programs that are funded in part by NASA's Office of Space Science. "Window on the Universe" is an education initiative that uses the fields of human space flight and the space sciences to engage entire communities in sustained science, mathematics, and technology education. "Voyage" is a permanent, outdoor scale model of our Solar System on the National Mall.

Lead: Dr. Jeffrey Goldstein, Challenger Center for Space Science Education, 1250 North Pitt Street, Alexandria, VA 22314. E-mail: [journey@challenger.org](mailto:journey@challenger.org). Phone: 703-683-9740.

URL: <http://www.challenger.org>

Activities: "Journey through the Universe" [A66]  
"To Mars with MER" [A455]

### **B7. OSS Outreach Activities (OSS/Outreach)**

Description: In keeping with our education outreach goal of "enhancing the quality of education," OSS participates in a number of education and outreach activities at both the regional and national levels. OSS supports a number of regional and national education conferences attended by thousands of educators in math, science, and technology. OSS supports various professional conferences attended by thousands of scientists from all fields of space science. The activities at these conferences usually entail showcasing an exhibit, distributing educational and outreach material (litho sets, posters, educator guides, strategic plans, etc.), conducting educational workshops, giving keynote speeches, highlighting various space science Web sites, and having NASA employees and scientists answer questions about space science. Finally, OSS staff members participate in more localized events such as conducting talks at local classrooms.

Lead: Ms. Ruth Netting, NASA Office of Space Science, NASA OSS, SB, Washington, DC 20546, Washington, DC 20546. E-mail: [rnetting@hq.nasa.gov](mailto:rnetting@hq.nasa.gov). Phone: 202-358-0539.

URL: <http://spacescience.nasa.gov/education>

Activities: Girl Scouts of the USA/NASA Collaboration [A65]  
NASA Space Science Outreach: International Technology Education Association Annual Conference [A398]  
National Society of Black Physicists Annual Convention [A72]  
Professional Societies of Minority Scientists/OSS Collaboration [A75]  
"Science Concepts in Context" [A235]  
Solar System Ambassadors Program [A421]  
Solar System Ambassadors Training [A422]  
"To Mars with MER" [A455]  
Tribute to the 2003 U.S. Physics Olympiad Team [A458]

### **B8. OSS Science Center Development**

Description: In keeping with our public outreach goal of "sharing the excitement of space science discoveries with the public," OSS supports a number of major development projects at science centers and planetariums across the country. Such projects typically entail the development or renovation of exhibit galleries or planetariums, coupled with the development of new exhibits, shows, and education programs based on the results of recent NASA space science missions and discoveries. These efforts make a substantial contribution to the general public's understanding of science and to communicating to students and the public the new understanding of the Universe derived from NASA's space science program.

Lead: Dr. Jeffrey Rosendhal, NASA Office of Space Science, Code S, Washington, DC 20546. E-mail: [jeffrey.rosendhal@hq.nasa.gov](mailto:jeffrey.rosendhal@hq.nasa.gov). Phone: 202-358-2470.

Contact: Dr. Philip Sakimoto, NASA Office of Space Science, Code SB, Washington, DC 20546. E-mail: [phil.sakimoto@hq.nasa.gov](mailto:phil.sakimoto@hq.nasa.gov). Phone: 202-358-0949.

URL: <http://spacescience.nasa.gov/education>

Activities: Observatory, Planetarium, Theater Project [A39]

### **B9. Passport to Knowledge (P2K)**

Description: Passport To Knowledge (P2K) is an ongoing series of interactive learning adventures: its mission is to inform and excite young people about basic scientific principles by sharing with them the people, places and processes of contemporary research. Supported by grants from NASA, the National Science Foundation, NOAA and other public and private resources, P2K has, since 1993, developed and distributed nearly 100 hours of original science programming, via public and NASA-TV. "Live From" specials have originated from the South Pole, the Amazon rainforest, and many NASA Centers. Space-related mini-series such as "Live From The



Hubble Space Telescope” have included technical and educational firsts, such as the first allocation of actual HST observing orbits to K–12 education. Passport To Knowledge, however, is much more than TV programs: P2K uses an integrated suite of video programs, hands-on activities, and online resources to deliver real science, real scientists, real locations, and real learning. From 1998 through the present, P2K has reformatted the original live specials into customized learning modules, once again including videos, Web sites and hands-on activities. Projects such as Passport to the Solar System (PTSS) and Science Concepts in Context (SCiC) use comments from NASA scientists and examples from all of the NASA Enterprises to place core science concepts in a real-world context. In 2002, P2K added a major grant from NSF’s informal science education program to its continuing NASA support to begin the ongoing “To Mars with MER” series (TMwM), following the efforts of the MER mission to design, build, launch, fly and successfully land the twin MER spacecraft on the Red Planet. TMwM features personal stories of the unusually diverse group of men and women behind the mission that will excite all young Americans, especially those in inner cities and remote rural communities.

**Lead:** Mr. Geoffrey Haines-Stiles, Geoff Haines-Stiles Productions, Inc., 27 Washington Valley Road, Morristown, NJ 07960. E-mail: [ghs@passporttoknowledge.com](mailto:ghs@passporttoknowledge.com). Phone: 973-656-9403.

**URL:** <http://passporttoknowledge.com>

**Activities:** “Live from the Aurora” and “Auroras: Living With a Star” [A274]  
 “Passport to the Solar System” (PTSS) [A232]  
 “Science Concepts in Context” [A235]  
 “To Mars with MER” [A455]

## E/PO SUPPORT NETWORK

### Forums

#### B11. Astronomical Search for Origins (ASO Forum)

**Description:** The Origins program is the scientific study of the long chain of events involved in the formation of the Universe, from the birth of the Universe in the Big Bang to the formation of galaxies, stars, planets, and the chemical elements of life to the profusion of life on Earth and possibly elsewhere. The overarching program funded by NASA that enables researchers to pursue these questions is called “Astronomical Search for Origins and Planetary Systems,” or ORIGINS for short. The ASO Forum is the public gateway to the research results, other data and information, and people behind this quest.

**Lead:** Dr. Ian Griffin, Space Telescope Science Institute, Office of Public Outreach, 3700 San Martin Drive, Baltimore, MD 21218. E-mail: [griffin@stsci.edu](mailto:griffin@stsci.edu). Phone: 410-338-4567.

**URL:** <http://origins.stsci.edu>

**Activities:** “Cosmic Questions” Informal Science: Midland Michigan [A353]  
 “Exceptional Space Science Materials for Exceptional Students” Workshop [A63]  
 Girl Scouts of the USA/NASA Collaboration [A65]  
 NASA Space Science Representation at NSACA Annual Conference [A400]  
 Origins: Education Forum Workshops/Presentations [A408]  
 Professional Societies of Minority Scientists/OSS Collaboration [A75]  
 Space Science Education Resource Directory [A124]  
 Space Science for Small Planetariums [A434]  
 Special Needs Resource Group [A77]

#### B12. Solar System Exploration (SSE Forum)

**Description:** NASA’s SSE Forum serves as the entry point and coordinator for E/PO activities and materials related to NASA’s Solar System Exploration missions and research activities. Our content includes the planets beyond Earth, comets, asteroids, other planetary bodies, and moons.

**Lead:** Ms. Leslie Lowes, NASA Jet Propulsion Laboratory, 180-109, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [Leslie.L.Lowes@jpl.nasa.gov](mailto:Leslie.L.Lowes@jpl.nasa.gov). Phone: 818-393-7734.

**Contact:** Dr. Ellis Miner, NASA Jet Propulsion Laboratory, MS 183-301, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [Ellis.D.Miner@jpl.nasa.gov](mailto:Ellis.D.Miner@jpl.nasa.gov). Phone: 818-354-4450.

**URL:** <http://sseforum.jpl.nasa.gov>

**Activities:** 4-H Youth Development Program: NASA OSS E/PO Collaboration [A330]  
 AAS Division of Planetary Sciences Activities [A466]  
 Education Standards Matrix (Quilt) Outreach [A225]

“Exceptional Space Science Materials for Exceptional Students” Workshop [A63]  
 Girl Scouts of the USA/NASA Collaboration [A65]  
 International Planetarium Society Partnership [A28]  
 “MarsQuest” Planetarium Show [A5]  
 Maryland Science Center SpaceLink Teachers’ Thursdays [A34]  
 NASA Space Science Representation at NSACA Annual Conference [A400]  
 Practical Uses of Math and Science (PUMAS) [A233]  
 Professional Societies of Minority Scientists/OSS Collaboration [A75]  
 “Science Concepts in Context” [A235]  
 Solar System Community Events Program [A423]  
 Solar System Exploration (SSE) Forum Summer E/PO Intern Program [A311]  
 Space Science Education Resource Directory [A124]  
 Space Science for Small Planetariums [A434]  
 Space Science Workshops for Educators [A198]  
 “Taking Apart the Light” [A126]  
 “To Mars with MER” [A455]  
 Workshops, Sessions, and Seminars for Scientists on K–14 Education and Public Outreach [A141]

### **B13. Structure and Evolution of the Universe (SEU Forum)**

**Description:** The SEU Forum shares the exciting discoveries and knowledge from NASA’s SEU missions and research programs with educators, students, and the general public. The SEU partnership brings together the rich expertise of scientists, science educators, and education researchers to develop innovative products and programs. Our goal is to contribute to the improvement of pre-college science education and increase science literacy at all levels, focusing attention on the human quest to understand the Universe and our place in the cosmos.

**Lead:** Dr. Roy Gould, Harvard-Smithsonian Center for Astrophysics, MS 71, 60 Garden Street, Cambridge, MA 02138. E-mail: [rgould@cfa.harvard.edu](mailto:rgould@cfa.harvard.edu). Phone: 617-496-7689.

**Contact:** Ms. Mary Dussault, Harvard-Smithsonian Center for Astrophysics, MS 71, 60 Garden Street, Cambridge, MA 02138. E-mail: [mdussault@cfa.harvard.edu](mailto:mdussault@cfa.harvard.edu). Phone: 617-496-7962.

**URL:** <http://cfa-www.harvard.edu/seuforum>

**Activities:**
 Author’s Nights at the Harvard-Smithsonian Center for Astrophysics [A341]  
 Childrens Night at the Harvard-Smithsonian Center for Astrophysics [A348]  
 “Cosmic Questions” Informal Science: “A Comedy about the Universe” [A352]  
 “Cosmic Questions” Informal Science: Midland Michigan [A353]  
 “Cosmic Questions” Informal Science: “The Real Time Machine” [A354]  
 “Cosmic Questions: Our Place in Space and Time” Traveling Exhibition [A9]  
 “Cosmic Questions”: Professional Development [A151]  
 “Exceptional Space Science Materials for Exceptional Students” Workshop [A63]  
 Girl Scouts of the USA/NASA Collaboration [A65]  
 “Journey to the Edge of Space and Time” Planetarium Show [A4]  
 MicroObservatory Online Telescopes [A231]  
 Monthly Observatory Nights at the Harvard-Smithsonian Center for Astrophysics [A391]  
 NASA Space Science Representation at NSACA Annual Conference [A400]  
 Professional Societies of Minority Scientists/OSS Collaboration [A75]  
 Sci-Fi Movie Nights at the Harvard-Smithsonian Center for Astrophysics [A413]  
 “Science Concepts in Context” [A235]  
 SEU Forum: Mission Support [A417]  
 SEU Forum: Support for Informal Science Education [A418]  
 Space Science Education Resource Directory [A124]  
 Space Science Workshops for Educators [A198]  
 Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]  
 Structure and Evolution of the Universe (SEU) Forum and the Urban School Initiative: Boston, MA [A138]  
 Structure and Evolution of the Universe (SEU) Forum and the Urban School Initiative: Cambridge, MA [A139]

### **B14. Sun-Earth Connection (SEC Forum)**

**Description:** The Sun-Earth Connection Forum shares the exciting discoveries and knowledge from NASA’s SEC missions and research programs with educators, students, and the general public. The SEC partnership brings together the rich expertise of scientists, educators, and museum personnel to develop innovative products and pro-

grams. Our goal is to contribute to the improvement of pre-college science education and increase science literacy at all levels, focusing attention on the active Sun and its effects on Earth.

**Lead:** Dr. Richard Vondrak, NASA Goddard Space Flight Center, 690, Greenbelt, MD 20771. E-mail: [rvondrak@pop600.gsfc.nasa.gov](mailto:rvondrak@pop600.gsfc.nasa.gov). Phone: 301-286-8112.

**Contact:** Dr. Isabel Hawkins, University of California, Berkeley, MC 7450, Berkeley, CA 94720. E-mail: [isabelh@ssl.berkeley.edu](mailto:isabelh@ssl.berkeley.edu). Phone: 510-643-5662.

**URL:** <http://sunearth.gsfc.nasa.gov>

**Activities:** “Exceptional Space Science Materials for Exceptional Students” Workshop [A63]  
 Girl Scouts of the USA/NASA Collaboration [A65]  
 NASA Earth and Space Education Workshop [A179]  
 NASA Langley Research Center Pre-Service Teacher Institute [A181]  
 NASA Space Science Representation at NSACA Annual Conference [A400]  
 National Society of Black Physicists Annual Convention [A72]  
 “Northern Lights” Planetarium Show [A7]  
 Professional Societies of Minority Scientists/OSS Collaboration [A75]  
 RHESSI Teacher Professional Development [A191]  
 RHESSI: Curriculum Dissemination [A234]  
 “Science Concepts in Context” [A235]  
 SEC Forum: Formal Education Student Support [A309]  
 SEC Forum: Informal and Public Outreach [A415]  
 SEC Forum: Outreach at Conferences [A416]  
 SECEF: Formal Education Curriculum Development [A236]  
 Solar Week [A123]  
 Space Science Education Resource Directory [A124]  
 Space Science Workshops for Educators [A198]  
 “Space Weather Center” Traveling Exhibit [A19]  
 Special Needs Resource Group [A77]  
 Student Observation Network (SON) [A319]  
 Sun-Earth Connection Education Forum (SECEF) Formal Education Systemic Improvement [A140]  
 Sun-Earth Connection Education Forum (SECEF) Preservice Teacher Education [A205]  
 Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A206]  
 Sun-Earth Connection Education Forum (SECEF) Targeted Outreach to Native Americans [A79]  
 Sun-Earth Connection: Online newsletter [A448]  
 Sun-Earth Connections Educator Kit [A125]  
 Sun-Earth Day [A449]  
 Sun-Earth Day Workshop [A476]  
 “The Northern Lights” [A129]  
 Workshops, Sessions, and Seminars for Scientists on K–14 Education and Public Outreach [A141]

## Broker-Facilitators

### **B15. DePaul University Broker/Facilitator (DePaul B/F)**

**Description:** The DePaul B/F assists space scientists and members of the education community in the states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, and Wisconsin to form partnerships that realize high leverage opportunities for education and outreach.

**Lead:** Dr. Lynn Narasimhan, DePaul University, 1 E. Jackson St., Chicago, IL 60604. E-mail: [cnarasim@depaul.edu](mailto:cnarasim@depaul.edu). Phone: 773-325-1854.

**Contact:** Dr. James Sweitzer, DePaul University, DePaul Space Science Center, 1 E. Jackson St., Chicago, IL 60604. E-mail: [jsweitze@depaul.edu](mailto:jsweitze@depaul.edu). Phone: 773-325-4637.

**URL:** <http://analyzer.depaul.edu/NASABroker>

**Activities:** Chicago Teachers’ Advisory [A136]  
 “Cosmic Questions” Informal Science: Midland Michigan [A353]  
 “Cosmic Questions”: Professional Development [A151]  
 “Exceptional Space Science Materials for Exceptional Students” Workshop [A63]  
 Midwestern Science Teachers Meetings [A177]  
 Professional Societies of Minority Scientists/OSS Collaboration [A75]



Space Science Education Resource Directory [A124]  
 Space Science for Amateur Astronomers [A433]  
 Space Science for Illinois and Indiana Teachers [A197]  
 Space Science for Small Planetariums [A434]  
 Space Science for the Visually Impaired [A76]  
 "To Mars with MER" [A455]  
 "To Mars with MER": Brokered Partnership Programs [A80]

#### **B16. Lunar and Planetary Institute Broker/Facilitator (LPI B/F)**

**Description:** The Lunar and Planetary Institute (LPI) provides a bridge between NASA's Solar System scientific missions and the academic community. Through LPI, visiting and staff scientists participate in studies of the current state, evolution, and formation of our Solar System. Resources at the LPI include a computing center, library, collections of lunar and planetary data, an image-processing facility, and publishing and conference services. The E/PO department focuses on providing access to current findings about our Solar System through a variety of programs for the formal and informal education realms. Examples include programs designed to bring space science activities and resources into public and school library settings; planetarium programs exploring space science through Native American legends; educator workshops sharing current solar system research; hands-on classroom activities developed in collaboration with staff scientists; and public outreach events geared toward young children, families, and older students/adults.

**Lead:** Dr. Stephanie Shipp, Lunar and Planetary Institute, 3600 Bay Area Boulevard, Houston, TX 77058-1113.  
 E-mail: [shipp@lpi.usra.edu](mailto:shipp@lpi.usra.edu). Phone: 281-486-2109.

**URL:** <http://www.lpi.usra.edu/education>

**Activities:** "Explore! Fun with Science" [A361]  
 Lunar and Planetary Science Conference (LPSC) Workshops for Scientists on E/PO Topics [A469]  
 Professional Societies of Minority Scientists/OSS Collaboration [A75]  
 Space Science Education Resource Directory [A124]  
 "To Mars with MER" [A455]

#### **B17. Mid-Atlantic Region Space Science Broker/Facilitator (MARSSB)**

**Description:** MARSSB serves as Broker/Facilitator (B/F) for the following nine states plus the District of Columbia: West Virginia, Pennsylvania, New York, Delaware, New Jersey, Maryland, Virginia, Kentucky, and Ohio. MARSSB employs three themes to fulfill its role as B/F: Systemic Reform through New Strategies, Technology Integration, and Diversity. The Systemic Reform through New Strategies theme will be addressed by offering on-line E/PO resources and by developing collaborations with existing systemic reform initiatives. One of the online resources, the Virtual Design Center (VDC), provides a NASA resource for stimulating development of research-based instructional technology to support classroom activities. UDC also disseminates new knowledge about how learning theories can be applied to instructional technology and classroom environments. The goal for increasing diversity in space science research and education will be addressed by developing an ongoing dialogue and collaboration with MU-SPIN, HBCUs, HISs, and minority initiatives of the NASA Space Science support network. The Technology Integration theme is addressed within the context of the Space Science Educational Activities and Training Sites (SSEATS). SSEATS establishes a network of host institutions that offer resources and workshop opportunities to pre-service and in-service educators based on OSS missions and facilities, standards-based curriculum materials, and links to other NASA education programs.

**Lead:** Dr. Nitin Naik, Wheeling Jesuit University, 316 Washington Avenue, Wheeling, WV 26003. E-mail: [nitin@cet.edu](mailto:nitin@cet.edu). Phone: 304-243-2388.

**Contact:** Dr. Laurie Ruberg, Wheeling Jesuit University, 316 Washington Avenue, Wheeling, WV 26003.  
 E-mail: [lruberg@cet.edu](mailto:lruberg@cet.edu). Phone: 304-243-2480.

**URL:** <http://www.cet.edu/ossbroker>

**Activities:** Mars Viewing at Howard University Planetarium [A380]  
 Maryland Science Center SpaceLink Teachers' Thursdays [A34]  
 Maryland Space Day E/PO [A388]  
 NASA Langley Research Center Pre-Service Teacher Institute [A181]  
 National Engineering Week [A402]  
 National Society of Black Physicists Annual Convention [A72]  
 Outreach to Community Planetariums [A40]  
 Professional Societies of Minority Scientists/OSS Collaboration [A75]  
 Space Science Education Resource Directory [A124]

Sun-Earth Connections Educator Kit [A125]  
 Sun-Earth Day Workshop [A476]  
 "To Mars with MER" [A455]  
 West Virginia: Mars Watch E/PO Activities [A463]

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### **B18. New England Space Science Initiative in Education Broker/Facilitator† (NESSIE B/F)**

**Description:** Founded in January 2002, NESSIE is the Broker/Facilitator for the New England states of Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine. NESSIE is charged with catalyzing and fostering collaborations among space scientists and educators within both the formal and informal education communities. NESSIE itself is a collaboration of scientists and science educators at the Museum of Science in Boston, the Harvard-Smithsonian Center for Astrophysics, and Tufts University. Its primary goals are to (1) broker partnerships among space scientists and educators, (2) facilitate a wide range of educational and public outreach activities, and (3) examine and improve space science education methods. NESSIE's unique strengths reside in its prime location (the Museum of Science), its diverse mix of scientists and educators, and its dedicated board of advisors. NESSIE's role as a clearinghouse and facilitator of space science education is being realized through its interactive Web site and via targeted meetings, workshops, and conferences involving scientists and educators. Special efforts are being made to reach underserved groups by tailoring programs to their particular educational needs and interests. These efforts are building on the experiences of prior and ongoing programs in space science education at the Museum of Science, the Harvard-Smithsonian Center for Astrophysics, Tufts University, and NASA.

**Lead:** Dr. Cary Sneider, Museum of Science, Education/NESSIE, Boston, MA 02114-1099. E-mail: [csneider@mos.org](mailto:csneider@mos.org). Phone: 617-589-0227.

**Contact:** Dr. William Waller, Tufts University, Department of Physics and Astronomy, Medford, MA 02155. E-mail: [wwaller@mos.org](mailto:wwaller@mos.org). Phone: 617-589-0227.

**URL:** <http://www.mos.org/nessie>

**Activities:** Astrobiology Guest Speaker Series [A337]  
 "Cosmic Questions": Professional Development [A151]  
 Current Science and Technology Center [A10]  
 "Mysteries of the Milky Way" Planetarium Show [A6]  
 NESSIE Outreach at Professional Conferences [A470]  
 New England After-School Programs in Space Science [A296]  
 New England Space Scientists in the Classroom [A297]  
 New England Workshops in Space Science Education [A185]  
 Professional Societies of Minority Scientists/OSS Collaboration [A75]  
 Public Presentations by New England Space Scientists [A410]  
 SEU Forum: Support for Informal Science Education [A418]  
 Space Science Education at Public Events in New England [A432]  
 Space Science Education in New England Colleges [A137]  
 Space Science Education Resource Directory [A124]  
 Space Science for the Visually Impaired [A76]  
 Space Science Workshops for Educators [A198]  
 "Stars of the Pharaohs" Planetarium Show [A8]  
 Structure and Evolution of the Universe (SEU) Forum and the Urban School Initiative: Boston, MA [A138]  
 Structure and Evolution of the Universe (SEU) Forum and the Urban School Initiative: Cambridge, MA [A139]  
 "To Mars with MER" [A455]  
 Workshops, Sessions, and Seminars for Scientists on K-14 Education and Public Outreach [A141]

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### **B19. Southeast Regional Clearinghouse Broker/Facilitator (SERCH B/F)**

**Description:** SERCH is a NASA Space Science E/PO program with the purpose of promoting space science awareness and enhancing interest in science, math, and technology through the use of OSS mission data, information, and educational products. SERCH works closely with 14 Space Grant consortia (Alabama, Arkansas, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, and Virginia) throughout the southeastern United States. SERCH serves as a Broker/Facilitator of services between the region's educational community and researchers involved in OSS missions. The goals of SERCH are to (1) develop a network of educators and researchers interested in space science, (2) be an effective interface between researchers and educators in the area of space science, (3) be a primary information and resource clearinghouse for space science data, information, and educational prod-

ucts, (4) support OSS mission scientists in their educational outreach activities, (5) facilitate the modification of OSS materials to meet the needs of diverse educational environments, (6) be a leader in serving exceptional students and the general public, (7) enhance minority involvement across NASA OSS programs, and (8) develop an accessible nationwide Geographic Information System (GIS) database that provides spatially related information of targeted NASA educational resources.

Lead: Dr. Cassandra Runyon, College of Charleston, Geology, Charleston, SC 29424. E-mail: [cass@cofc.edu](mailto:cass@cofc.edu). Phone: 843-953-8279.

URL: <http://serch.cofc.edu/serch>

Activities: A Space Science and Astronomy Workshop for Teachers [A142]  
Backyard Astronomy [A342]  
Enhancement of the Space Science Research Program at South Carolina State University [A48]  
"Exceptional Space Science Materials for Exceptional Students" Workshop [A63]  
"Exceptional Space Science Materials for Exceptional Students": Follow-up Workshops [A64]  
Professional Societies of Minority Scientists/OSS Collaboration [A75]  
Space Science Education Resource Directory [A124]  
Space Science for the Visually Impaired [A76]  
Special Needs Resource Group [A77]  
STARLAB Portable Planetarium Regional Loan Program [A317]  
Students Acquiring Real Science (STARS) [A320]  
Video and Laboratory Curriculum in NASA OSS Themes for DC Public Schools [A238]

## **B20. Space Science Institute Broker/Facilitator (SSI B/F)**

Description: The Space Science Institute (SSI) of Boulder, Colorado is home to one of seven regional Broker/Facilitator (B/F) programs that supports OSS E/PO efforts. The core mission of B/Fs is to cultivate opportunities and partnerships between the education and space science communities that can address important educational needs in their respective regions. The SSI B/F program now serves a large part of the United States, extending from North Dakota to California (Arizona, California, Colorado, Nebraska, North Dakota, New Mexico, Nevada, South Dakota, Utah). SSI is building on four years of "lessons learned" in the B/F role. The goals of our B/F program are to provide strategically valuable support for (1) space scientists' effective E/PO involvement, (2) formal education (emphasizing state-based agendas), (3) informal education (emphasizing planetarium associations, Girl Scouts, and traveling science exhibits), and (4) underserved populations (emphasizing indigenous and Latino educators). This strategic support includes providing professional development opportunities; facilitating access to and use of exemplary materials; and facilitating E/PO participation and/or partnership. Key collaborators of the SSI B/F program include leaders from two western planetarium associations, the Girl Scouts' Mile-Hi Council, mobile education programs, traveling exhibit programs, the MESA after-school programs, and E/PO leads at major scientific research institutions in our region. To begin to address the vastness of our region, we are developing new electronic resources (e-brokering) for both scientists and educators.

Lead: Dr. Cheryl Lynn Morrow, Space Science Institute, 4750 Walnut Street, Boulder, CO 80301. E-mail: [camorrow@colorado.edu](mailto:camorrow@colorado.edu). Phone: 720-974-5828.

Contact: Ms. Christy Edwards, Space Science Institute, 4750 Walnut Street, Boulder, CO 80301. E-mail: [edwardcl@colorado.edu](mailto:edwardcl@colorado.edu). Phone: 720-974-5824.

URL: <http://ssibroker.colorado.edu/broker>

Activities: Electronic Newsletter: Bulletin for Educators in Space Science (BESS) [A155]  
Electronic Newsletter: Regional Opportunities for Scientists in Education [A467]  
Girl Scouts of the USA/NASA Collaboration [A65]  
Interactive Exhibits at Community Events [A376]  
"MarsQuest" Planetarium Show [A5]  
"MarsQuest" Traveling Exhibit [A17]  
Outreach to Native Americans in the Western Region [A74]  
Professional Societies of Minority Scientists/OSS Collaboration [A75]  
SEU Forum: Support for Informal Science Education [A418]  
Space Science Education Resource Directory [A124]  
Space Science Workshops for Educators [A198]  
"Space Weather Center" Traveling Exhibit [A19]  
Teaching "Kinesthetic Astronomy" [A127]  
"To Mars with MER" [A455]  
Workshops, Sessions, and Seminars for Scientists on K-14 Education and Public Outreach [A141]

**B21. Space Science Network Northwest Broker/Facilitator****S2N2 B/F)**

**Description:** S2N2 uses a variety of approaches to make formal and informal educators aware of NASA Space Science programs, materials and opportunities. S2N2 helps to create sustainable partnerships between formal and informal educators and NASA OSS missions, forums and space scientists. S2N2 operates by having a central office at the University of Washington and representatives in the partner states of Washington, Alaska, Hawaii, Oregon, Montana, Idaho, and Wyoming.

**Lead:** Dr. Julie Lutz, University of Washington, Seattle, WA 98195. E-mail: [nasaerc@u.washington.edu](mailto:nasaerc@u.washington.edu). Phone: 206-543-0214.

**Contact:** Ms. Nancy Cooper, University of Washington, Box 351310/ESS/S2N2, Seattle, WA 98195.  
E-mail: [s2n2@u.washington.edu](mailto:s2n2@u.washington.edu). Phone: 206-543-0214.

**URL:** <http://www.s2n2.org>

**Activities:** African American Space Scientists Exhibit [A333]  
Astronomy for UW GEAR-UP Students [A243]  
Educator Workshops: Space Science Network Northwest [A154]  
Girl Scouts of the USA/NASA Collaboration [A65]  
Professional Societies of Minority Scientists/OSS Collaboration [A75]  
Solstice Celebration [A426]  
Space Science Education Resource Directory [A124]  
Space Science Network Northwest: Scientist Talks [A435]  
Space Spot Shopping Mall Exhibit [A436]  
STARLAB Training for Teachers [A202]  
Sun-Earth-Moon System Exhibit at University of Wyoming Planetarium [A20]  
Towards Other Planetary Systems (TOPS) Astronomy Workshop [A214]  
Towards Other Planetary Systems (TOPS): Astronomy Workshop for Marshall Islands and Micronesia Teachers [A215]  
Traveling Meteorite Display in Wyoming Libraries [A21]  
Wyoming Astronomy Camp [A465]

**ASTRONOMICAL SEARCH FOR ORIGINS MISSIONS****Major Missions****B22. Hubble Space Telescope (HST)**

**Description:** The Office of Public Outreach at the STScI was created to share the amazing discoveries of the Hubble Space Telescope with the American public. We are privileged to be the focal point of public attention for a storied NASA/ESA space science mission to which thousands of engineers, programmers, technicians, administrators and scientists have devoted their professional gifts. We have developed a multitude of products and programs that have capitalized on the intense interest in Hubble to inform and inspire millions of Americans and many others around the globe.

**Lead:** Dr. Ian Griffin, Space Telescope Science Institute, Office of Public Outreach, 3700 San Martin Drive, Baltimore, MD 21218. E-mail: [griffin@stsci.edu](mailto:griffin@stsci.edu). Phone: 410-338-4567.

**URL:** <http://hubblesite.org>

**Activities:** Adler After School [A240]  
"Amazing Space" Capture the Cosmos [A82]  
"Amazing Space" Glossary [A83]  
"Amazing Space" Graphic Organizers [A84]  
"Amazing Space" Homework Help [A85]  
"Amazing Space" Pictures and Facts [A86]  
"Amazing Space" Questions and Answers [A87]  
"Amazing Space" Science Content Reading [A88]  
"Cosmic Questions" Informal Science: Midland Michigan [A353]  
Enhancement of the Space Science Research Program at South Carolina State University [A48]  
Girl Scouts of the USA/NASA Collaboration [A65]  
HST Cycle E/PO Grant: "Accessible Universe: Making Astronomy Accessible in the Regular Elementary Classroom" [A101]

HST Cycle E/PO Grant: Exhibit of HST Images and Space Hardware [A11]  
 HST Cycle E/PO Grant: Mapping the Solar Neighborhood [A102]  
 HST Cycle E/PO Grant: Mice, Monsters and Other Celestial Beasts—A Space Safari [A2]  
 HST Cycle E/PO Grant: “Reach for the Stars” [A165]  
 HST Cycle E/PO Grant: Scientific Living [A370]  
 HST Cycle Education/Public Outreach Grant: Value-Added Educational Tutorials for HST Data [A227]  
 HST Formal Education [A103]  
 HST Lithograph [A104]  
 HST: “Amazing Space” [A105]  
 HST: Astronomy Day 2003 [A371]  
 HST: Speaker’s Bureau [A372]  
 HST: Workshops and Presentations [A228]  
 Hubble Space Telescope: Immersive Dome Visualizations for Planetariums [A25]  
 Hubble Space Telescope: International Planetarium Society Slide Service [A26]  
 “Hubble Space Telescope: New Views of the Universe” (Version 2) [A12]  
 Hubble Space Telescope: Online Broadcast-Quality Hubble Video Clip Library [A27]  
 Hubble Space Telescope: “ViewSpace” CD Distribution [A13]  
 Hubble Space Telescope: “ViewSpace” Internet Distribution [A14]  
 “In Search of . . . Galaxies” [A113]  
 Open Night at the Space Telescope Science Institute [A407]  
 “Passport to the Solar System” (PTSS) [A232]  
 “Science Concepts in Context” [A235]  
 The Electromagnetic Spectrum Poster [A128]  
 Warped Galaxy Lithograph [A134]

### **B23. James Webb Space Telescope (JWST)**

**Description:** The JWST E/PO program is led by the Space Telescope Science Institute (STScI). With the launch planned for 2009 or 2010, a modest level of resources are planned until 2006 or 2007. As STScI is also responsible for HST E/PO, we are using the interest in HST to introduce the public to this future mission as the next major leap forward in space discovery. Through the Origins Education Forum, we are keeping abreast of the activities of the Spitzer space Telescope and SOFIA missions to promote public understanding of infrared light and will seek opportunities to partner with them. One new program was initiated in the past year by the University of Arizona Near Infrared Camera (NIRCam) science team to develop astronomy camps specifically designed for Girl Scouts.

**Lead:** Ms. Peg Stanley, Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218.  
E-mail: [pstanley@stsci.edu](mailto:pstanley@stsci.edu). Phone: 410-338-4536.

**URL:** <http://nextgen.stsci.edu>

**Activities:** Astronomy Camp for Girl Scout Leaders [A339]  
The Electromagnetic Spectrum Poster [A128]

### **B24. Kepler**

**Description:** The Kepler mission E/PO includes formal education elements: GEMS teacher guides, teacher workshops, “Hands-on Universe” high school activities, KeplerCam CCD cameras for colleges; informal education elements: planetarium shows, museum exhibits, public events; and public outreach: public video program, Stardate radio programs, and amateur astronomer’s kits.

**Lead:** Alan Gould, Lawrence Hall of Science, Kepler, 1 Centennial Drive, Berkeley, CA 94701. E-mail: [agould@uclink.berkeley.edu](mailto:agould@uclink.berkeley.edu). Phone: 510-643-5082.

**Contact:** Edna DeVore, SETI Institute, 2035 Landings Dr., Mountain View, CA 94043.  
E-mail: [edevore@seti.org](mailto:edevore@seti.org). Phone: 650-960-4538.

**URL:** <http://www.kepler.arc.nasa.gov>

**Activities:** Classroom Presentations by Kepler Scientists and Engineers [A251]  
Internet Initiatives [A378]  
Involving Scientists in E/PO [A468]  
Kepler Cam: Providing Planet-Finding Hardware and Data Techniques to Minority Colleges and Universities [A67]  
SOFIA, SETI, and Kepler Mission Conference Exhibit Booth [A194]  
Teacher Workshops on Planet Finding [A207]  
The Electromagnetic Spectrum Poster [A128]



**B25. Spitzer Space Telescope (SST)**

**Description:** The Spitzer Space Telescope E/PO program strives to address NASA's goals of reaching a wide audience and inspiring the next generation of explorers. Our formal education initiative includes a fully-accredited online course which teachers may take for continuing education credit or as part of a master's degree in science education. We also offer short courses at all National Science Teachers Association (NSTA) meetings and regional state teacher meetings. In the informal education realm, we are developing a series of ViewSpace presentations, which reach over 100 planetariums and science museums. We are also part of a collaboration on a new traveling museum exhibit on the Origins programs which will debut in 2005. This year saw multiple articles and television segments about our launch and successful start-up, and we are addressing the challenge of getting new science and educational materials out to the public as soon as possible.

**Lead:** Dr. Michelle Thaller, California Institute of Technology, 100-22, 1200 East California Blvd., Pasadena, CA 91125.  
E-mail: [thaller@ipac.caltech.edu](mailto:thaller@ipac.caltech.edu). Phone: 626-395-8670.

**URL:** <http://sirtf.caltech.edu>

**Activities:** "Active Astronomy": Classroom Activities for Learning About Infrared Light [A144]  
"Beyond the Visible Universe: Teaching Invisible Astronomy" [A145]  
Girl Scouts of the USA/NASA Collaboration [A65]  
"Science Concepts in Context" [A235]  
Spitzer Space Telescope and SOFIA Online Course [A200]  
Spitzer Space Telescope "Ask an Astronomer" Videos [A437]  
Spitzer Space Telescope Conference Support [A475]  
Spitzer Space Telescope Educator Workshops [A201]  
Spitzer Space Telescope Webcast, TV, and Radio Presentations [A438]  
Spitzer Space Telescope-sponsored Publications [A439]  
Spitzer Space Telescope: "Ask an Astronomer" Helpdesk [A440]  
Spitzer Space Telescope: Classroom Visits [A314]  
Spitzer Space Telescope: Curriculum Materials Distribution [A315]  
Spitzer Space Telescope: Large Public Presentations [A441]  
Spitzer Space Telescope: Public Exhibits [A442]  
Spitzer Space Telescope: Web Activities [A443]  
The Electromagnetic Spectrum Poster [A128]

**B26. Stratospheric Observatory for Infrared Astronomy (SOFIA)**

**Description:** SOFIA will consist of a specially modified Boeing 747-SP aircraft carrying a 2.5-meter telescope designed to make sensitive infrared measurements of a wide range of astronomical objects. SOFIA will be a premier observatory for infrared and sub-millimeter astronomy for the next two decades. SOFIA's E/PO program contributes to the improvement of America's public scientific, mathematical and technological literacy and greater awareness of the value of scientific research. SOFIA was designed from the beginning with the capability to allow visiting educators and journalists to observe and participate in the research process. SOFIA's E/PO program will bring the excitement, challenges, discoveries, teamwork, and educational value of the observatory's research to teachers, students, and the general public on a national and international scale. SOFIA E/PO programs include: (1) Airborne Astronomy Ambassadors — trained educators who will fly on research missions and comprise a national network of master educators who conduct teacher workshops and public presentations, (2) Education Partners Program — SOFIA scientists, instrument builders, engineers, technicians, flight crew and educators who will partner with teachers in their local communities, (3) Science Literacy and Education Program — symposia at NASA Ames for undergraduate instructors, science and technology center staff, and planetarium directors, and (4) SOFIA Visiting Educators — a small number of experienced educators who will join the SOFIA E/PO staff for 1-year stints as flight facilitators and outreach personnel. The E/PO program will support a public affairs team that works with the NASA Office of Public Affairs to communicate SOFIA science effectively. SOFIA will be operated for NASA and the German space agency DLR by Universities Space Research Association (USRA). The E/PO program is jointly conducted by the SETI Institute, the Astronomical Society of the Pacific (ASP), and members of the USRA SOFIA team.

**Lead:** Dr. Dana Backman, NASA Ames Research Center, USRA / SOFIA, MS 144-2, Moffett Field, CA 94035-1000.  
E-mail: [dbackman@mail.arc.nasa.gov](mailto:dbackman@mail.arc.nasa.gov). Phone: 650-604-2128.

**URL:** <http://sofia.arc.nasa.gov>

**Activities:** "Active Astronomy": Classroom Activities for Learning About Infrared Light [A144]  
Aeronautical Exposition for Students [A241]

Air Expo for the Public (Moffett Field Air Show) [A334]  
 Ames Research Center: SOFIA Exhibit [A336]  
 Astronomy at 41,000 Feet—The Story of SOFIA [A338]  
 “Beyond the Visible Universe: Teaching Invisible Astronomy” [A145]  
 Electromagnetic Radiation, Astronomy, and SOFIA (for Blind/Visually Impaired Students) [A62]  
 Electromagnetic Radiation, Infrared Astronomy, and SOFIA [A200]  
 Girl Scouts of the USA/NASA Collaboration [A65]  
 “Passport to the Solar System” (PTSS) [A232]  
 Project ASTRO: Los Gatos Schools and Los Altos Girl Scouts [A304]  
 “Science Concepts in Context” [A235]  
 SOFIA, SETI, and Kepler Mission Conference Exhibit Booth [A194]  
 SOFIA and HAWC: Yerkes Observatory Tour [A419]  
 SOFIA Conference Exhibit and Booth [A472]  
 SOFIA E/PO Conference Posters [A473]  
 Space Day at San Jose Tech Museum of Innovation [A429]  
 Space Science for Amateur Astronomers [A433]  
 Space Science for the Visually Impaired [A76]  
 The Electromagnetic Spectrum Poster [A128]  
 Tours of the Kuiper Airborne Observatory (KAO) Interior [A456]  
 Workshops, Sessions, and Seminars for Scientists on K–14 Education and Public Outreach [A141]

## Navigator

### B27. Navigator Program

#### Navigator)

**Description:** Navigator E/PO initiatives fall into three key programmatic areas: formal education, informal education, and public outreach (including Internet and media). Additionally, several crosscutting activities support various components of the plan. All Navigator activities are important to the success of the program, however, two initiatives (the Community College Initiative and the Night Sky Network: Engaging Amateur Astronomy Clubs) stand out as significant new investments for Navigator and may serve as platforms for the participation of other NASA missions in the future.

**Lead:** Mr. W. Michael Greene, NASA Jet Propulsion Laboratory, 301-486, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [william.m.greene@jpl.nasa.gov](mailto:william.m.greene@jpl.nasa.gov). Phone: 818-354-1277.

**URL:** <http://planetquest.jpl.nasa.gov>

**Activities:** Girl Scouts of the USA/NASA Collaboration [A65]  
 Internet Initiatives [A378]  
 Navigator Community College Initiative [A183]  
 Navigator Educational Workshops and Conference Participation [A184]  
 Navigator Program Museum Exhibits and Alliances [A38]  
 Navigator Research Experiences for Minorities [A73]  
 Navigator Science Events [A403]  
 Navigator: Student Support and Classroom Visits [A294]  
 PlanetQuest Student Activity Guide [A121]  
 Solar System Community Events Program [A423]  
 Space Science for Amateur Astronomers [A433]  
 The Night Sky Network: Engaging Amateur Astronomy Clubs [A452]

### B28. Keck Interferometer

#### KECK)

**Description:** The search for planets in other solar systems (extrasolar planets), and the possibility of extraterrestrial life are topics with the potential for engaging the imagination of a large variety of audiences, from a variety of ages, and cultural and educational backgrounds. The E/PO program of the KECK/IOTA (Infrared Optical Telescope Array) team aims at exploiting this interest to promote learning of basic physics, planetary science, and astronomy, and to outreach into underrepresented groups in science and technology. We have an exceptional opportunity to introduce non-scientists, educators, and students to the interdisciplinary practice of science, while they learn about the location of Earth within the Solar System and the privileged position of Earth in it for the onset of life. They discover that although Earth and the Solar System appear to be somewhat unique,

other similar systems may yet be found, and they learn about the ways in which technology has increased our capabilities of searching for planets where life may exist. In addition, KECK participates in the overall Navigator E/PO program.

Lead: Dr. Irene Porro, Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, MS19, 60 Garden Street, Cambridge, MA 02138. E-mail: [iporro@space.mit.edu](mailto:iporro@space.mit.edu). Phone: 617-258-7481.

URL: <http://cfa-www.harvard.edu/cfa/oir/IOTA>

Activities: Astrobiology Guest Speaker Series [A337]  
 "Cosmic Questions" Informal Science: Midland Michigan [A353]  
 Girl Scouts of the USA/NASA Collaboration [A65]  
 Internet Initiatives [A378]  
 Navigator Community College Initiative [A183]  
 Navigator Educational Workshops and Conference Participation [A184]  
 Navigator Program Museum Exhibits and Alliances [A38]  
 Navigator Science Events [A403]  
 Navigator: Student Support and Classroom Visits [A294]  
 "Passport to the Solar System" (PTSS) [A232]  
 PlanetQuest Student Activity Guide [A121]  
 Public Presentations by New England Space Scientists [A410]  
 "Science Concepts in Context" [A235]  
 The Electromagnetic Spectrum Poster [A128]  
 The Night Sky Network: Engaging Amateur Astronomy Clubs [A452]

### **B29. Large Binocular Telescope Interferometer (LBTI)**

Description: LBTI participates in the overall Navigator E/PO program.

Lead: Mr. W. Michael Greene, NASA Jet Propulsion Laboratory, 301-486, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [william.m.greene@jpl.nasa.gov](mailto:william.m.greene@jpl.nasa.gov). Phone: 818-354-1277.

URL: <http://planetquest.jpl.nasa.gov>

Activities: Internet Initiatives [A378]  
 Navigator Educational Workshops and Conference Participation [A184]  
 Navigator Science Events [A403]  
 Navigator: Student Support and Classroom Visits [A294]  
 PlanetQuest Student Activity Guide [A121]

### **B30. Michelson Science Center (MSC)**

Description: MSC is a science operations and analysis service organization for selected NASA Origins theme projects and the scientists and engineers who use them. MSC facilitates the timely and successful execution of Origins theme science by providing software infrastructure, science operations, and consulting to Navigator projects and their user communities. MSC participates in the overall Navigator education and public outreach program.

Lead: Mr. W. Michael Greene, NASA Jet Propulsion Laboratory, 301-486, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [william.m.greene@jpl.nasa.gov](mailto:william.m.greene@jpl.nasa.gov). Phone: 818-354-1277.

URL: <http://planetquest.jpl.nasa.gov>

Activities: Internet Initiatives [A378]  
 Navigator Science Events [A403]  
 PlanetQuest Student Activity Guide [A121]

### **B31. Space Interferometry Mission (SIM)**

Description: SIM participates in the overall Navigator E/PO program.

Lead: Mr. W. Michael Greene, NASA Jet Propulsion Laboratory, 301-486, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [william.m.greene@jpl.nasa.gov](mailto:william.m.greene@jpl.nasa.gov). Phone: 818-354-1277.

URL: <http://planetquest.jpl.nasa.gov>

Activities: "Astro-Venture" [A89]  
 Girl Scouts of the USA/NASA Collaboration [A65]  
 Internet Initiatives [A378]  
 Navigator Community College Initiative [A183]  
 Navigator Educational Workshops and Conference Participation [A184]  
 Navigator Program Museum Exhibits and Alliances [A38]  
 Navigator Science Events [A403]

Navigator: Student Support and Classroom Visits [A294]  
 PlanetQuest Student Activity Guide [A121]  
 The Electromagnetic Spectrum Poster [A128]  
 The Night Sky Network: Engaging Amateur Astronomy Clubs [A452]

### **B32. Terrestrial Planet Finder (TPF)**

Description: TPF participates in the overall Navigator E/PO program.  
 Lead: Mr. W. Michael Greene, NASA Jet Propulsion Laboratory, 301-486, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [william.m.greene@jpl.nasa.gov](mailto:william.m.greene@jpl.nasa.gov). Phone: 818-354-1277.  
 URL: <http://planetquest.jpl.nasa.gov>  
 Activities: "Astro-Venture" [A89]  
 Girl Scouts of the USA/NASA Collaboration [A65]  
 Internet Initiatives [A378]  
 Navigator Community College Initiative [A183]  
 Navigator Educational Workshops and Conference Participation [A184]  
 Navigator Program Museum Exhibits and Alliances [A38]  
 Navigator Science Events [A403]  
 Navigator: Student Support and Classroom Visits [A294]  
 PlanetQuest Student Activity Guide [A121]  
 The Electromagnetic Spectrum Poster [A128]  
 The Night Sky Network: Engaging Amateur Astronomy Clubs [A452]  
 York College Observatory Educational Outreach Program (YC00P) [A58]

## **Explorers**

### **B33. Far-Ultraviolet Spectroscopic Explorer (FUSE)**

Description: FUSE is designed for a very specialized and unique task that is complementary to other NASA missions. FUSE looks at light in the far ultraviolet portion of the electromagnetic spectrum (approximately 90 to 120 nanometers), which is unobservable with other telescopes. FUSE observes these wavelengths with much greater sensitivity and resolving power than instruments previously used to study light in this wavelength range. The FUSE E/PO program has developed educational kits for middle and high school, conducted educator workshops, and provided exhibits for museums.  
 Lead: Ms. Luciana Bianchi, Johns Hopkins Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099. E-mail: [bianchi@skysrv.pha.jhu.edu](mailto:bianchi@skysrv.pha.jhu.edu). Phone: 410-516-4009.  
 URL: <http://fuse.pha.jhu.edu/outreach>  
 Activities: The Electromagnetic Spectrum Poster [A128]

## **Other NASA Programs**

### **B34. NASA Astrobiology Institute, (NAI)**

Description: NAI is building a future community of astrobiologists while expanding the public's understanding of the nature and importance of our work. NAI's E/PO program is distributed throughout its Lead Teams. Each Team directs a local effort with specific emphasis on that Team's research and expertise while contributing to larger collaborative projects. These include Web sites, print products, and curriculum supplements, as well as educational programs and activities, internships, presentations, and exhibits. Educating and training the next generation is another important aspect of NAI's mission, essential to ensuring continuity and longevity of the field of astrobiology. Many of our members train new researchers directly in their academic programs and laboratories. While some of these courses and programs are called "astrobiology", many of them reside within traditional astronomy, biology, chemistry, geology, and planetary science departments. In this way, NAI members are growing the field of astrobiology both as an independent discipline and through the expansion of traditional approaches.  
 Lead: Ms. Kristina Wilmoth, NASA Astrobiology Institute, Ames Research Center MS 240-1, Moffett Field, CA 94035. E-mail: [kwilmoth@mail.arc.nasa.gov](mailto:kwilmoth@mail.arc.nasa.gov).  
 Contact: Ms. Daniella Scalice, NASA Astrobiology Institute, Ames Research Center MS 240-1, Moffett Field, CA 94035. E-mail: [dscalice@mail.arc.nasa.gov](mailto:dscalice@mail.arc.nasa.gov). Phone: 650-604-4024.  
 URL: <http://nai.arc.nasa.gov>  
 Activities: Astrobiology Microscope Web Site [A220]

Astrobiology: Discovering New Worlds of Life Interactive Poster [A90]  
 Astrobiology: The Search for Life in the Universe (Magazine) [A91]  
 Enhancement of the Space Science Research Program at South Carolina State University [A48]  
 "Fingerprints of Life?": Development of Classroom Activities, Web Site, and CD-ROM [A226]  
 Ice in the Solar System Interactive CDROM [A106]  
 NASA Ames Astrobiology Institute Lead Team [A36]  
 NASA Ames Astrobiology Institute Lead Team/Yellowstone National Park Partnership [A392]  
 NASA Astrobiology Institute (NAI) Research Sabbaticals for Minority Institutions [A68]  
 NASA Astrobiology Institute (NAI)—Ames Research Center: Microbial Mat Laboratory Tours [A393]  
 NASA Astrobiology Institute (NAI)—Ames Research Center: Astrobiology Academy [A285]  
 NASA Astrobiology Institute (NAI)—Astrobiology for Teachers: An Online Graduate Course [A178]  
 NASA Astrobiology Institute (NAI)—Astrobiology in the Public Eye [A394]  
 NASA Astrobiology Institute (NAI)—Carnegie Institution of Washington: Astrobiology Articles in the Spectrum Newsletter [A395]  
 NASA Astrobiology Institute (NAI)—Colorado University: Astrobiology Traveling Show [A286]  
 NASA Astrobiology Institute (NAI)—Marine Biological Laboratory: Classroom Presentations on Microbial Mats [A287]  
 NASA Astrobiology Institute (NAI)—Penn State University: Astrobiology Summer Program (ASP) [A288]  
 NASA Astrobiology Institute (NAI)—University of Washington: Center for Astrobiology and Early Evolution Newsletter [A396]  
 NASA Astrobiology Institute (NAI)—Video Collection Project [A397]  
 NASA Astrobiology Institute (NAI): "Ask an Astrobiologist" [A289]  
 NASA Astrobiology Institute (NAI): Astro-Venture [A290]  
 NASA Astrobiology Institute (NAI): Involvement with Undergraduate and Graduate Students [A291]  
 NASA Astrobiology Institute/Johnson Space Center: Minority and Underrepresented Education and Public Outreach [A69]  
 NASA Astrobiology Institute/Penn State University: Women In Science and Engineering Research (WISER) [A70]  
 NASA Astrobiology Institute/UCLA: The Licancabur Expedition [A292]  
 NASA Astrobiology Institute/University of Washington: Astrobiology on the School Front—Interning and Mentoring [A71]  
 NASA Astrobiology Institute: "Cosmic Origins" Traveling Museum Exhibit [A37]  
 "Passport to the Solar System" (PTSS) [A232]  
 Project AstroBio [A189]  
 Resources for Teaching About Life on Earth and Beyond: National Science Teachers Association Short Course [A190]  
 "Science Concepts in Context" [A235]  
 Solar System Community Events Program [A423]  
 Teachers Experience Astrobiology: NASA Astrobiology Institute (NAI) Workshops and Short Courses [A208]  
 The Electromagnetic Spectrum Poster [A128]  
 "Voyages Through Time": High School Astrobiology Curriculum [A239]

### **B35. Two Micron All-Sky Survey (2MASS)**

**Description:** The 2MASS project was designed to close the gap between our current technical capability and our knowledge of the near-infrared sky. In addition to providing a context for the interpretation of results obtained at infrared and other wavelengths, 2MASS is providing direct answers to immediate questions on the large-scale structure of the Milky Way and the local Universe. The optimal use of the next generation of infrared space missions, such as the HST Near Infrared Camera and Multi-Object Spectrometer (NICMOS), the Spitzer Space Telescope, and the Next Generation Space Telescope (NGST) as well as powerful ground-based facilities, such as Keck I, Keck II, and Gemini, required a new census with vastly improved sensitivity and astrometric accuracy than was previously available. To achieve these goals, 2MASS uniformly scanned the entire sky in three near-infrared bands to detect and characterize point sources brighter than about 1 mJy in each band, with a signal-to-noise ratio (SNR) greater than 10, using a pixel size of 2.0 arcseconds. This achieved an 80,000-fold improvement in sensitivity, relative to earlier surveys.

**URL:** <http://www.ipac.caltech.edu/2mass>

**Activities:** "Passport to the Solar System" (PTSS) [A232]

"Science Concepts in Context" [A235]

York College Observatory Educational Outreach Program (YCOOP) [A58]



## SOLAR SYSTEM EXPLORATION MISSIONS

### Major Missions

#### B37. Cassini/Huygens Probe

**Description:** The Cassini-Huygens E/PO mission is dedicated to bringing the excitement of the Cassini mission and the Saturn system to audiences throughout the nation and abroad. Educational activities, cooperative educator programs, educator conferences, public Web access, media support and releases, museum participation, and the Cassini Speakers' group are just a few of the ways we seek to engage the public in this multi-national exploration program to Saturn. The formal education component focuses on "Reading, Writing, and Rings," an integrated reading and language arts program for grades 1-4. The Saturn Observation Campaign brings amateur astronomers into the Cassini community. Members host star parties where participants view Saturn. The "Ring World" planetarium show is targetted at mid-range planetariums. Ongoing efforts include: Cassini Speakers, Solar System Ambassador support, and the 5-12 formal education program "Saturn In Your Kitchen and Backyard."

**Lead:** Ms. Alice Wessen, NASA Jet Propulsion Laboratory, 233-201, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [Alice.S.Wessen@jpl.nasa.gov](mailto:Alice.S.Wessen@jpl.nasa.gov). Phone: 818-354-4930.

**Contact:** Ms. Shannon McConnell, NASA Jet Propulsion Laboratory, MS 230-101, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [shannon.mcconnell@jpl.nasa.gov](mailto:shannon.mcconnell@jpl.nasa.gov). Phone: 818-393-5815.

**URL:** <http://saturn.jpl.nasa.gov>

**Activities:** "Astro-Venture" [A89]  
Cassini Sky-Watching Events [A343]  
Cassini Talks [A344]  
International Planetarium Society Partnership [A28]  
"Passport to the Solar System" (PTSS) [A232]  
Saturn Observing Campaign [A412]  
"Science Concepts in Context" [A235]  
Shorefest School Visits [A310]  
Solar System Community Events Program [A423]  
Space Science Workshops for Educators [A198]

#### B38. Galileo

**Description:** The primary focus of the Galileo E/PO program has been to archive our scientific achievements using the Galileo Web site. Support of speakers and Solar System Ambassadors continued until Galileo's end of mission impact of Jupiter in September 2003.

**Lead:** Ms. Shannon McConnell, NASA Jet Propulsion Laboratory, MS 230-101, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [shannon.mcconnell@jpl.nasa.gov](mailto:shannon.mcconnell@jpl.nasa.gov). Phone: 818-393-5815.

**URL:** <http://jpl.nasa.gov/galileo>

**Activities:** Far Out Friday [A362]  
Galileo Classroom Visits [A259]  
Goldstone Apple Valley Radio Telescope (GAVRT) Classroom Implementation and Special Projects [A261]  
"Goodbye to Galileo" Coverage [A369]  
International Planetarium Society Partnership [A28]  
"Science Concepts in Context" [A235]  
Shorefest School Visits [A310]

#### B39. Jet Propulsion Laboratory Solar System Exploration (JPL SSE) Theme Lead

**Description:** The JPL SSE Theme Lead coordinates the activities of NASA Jet Propulsion Laboratory's Solar System exploration mission outreach coordinators and specialists in media relations, television production, Internet services, and education (both formal and informal). The lead also coordinates the science data analysis and research activities of the missions.

**Lead:** Ms. Anita Sohus, NASA Jet Propulsion Laboratory, 233-201, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [Anita.M.Sohus@jpl.nasa.gov](mailto:Anita.M.Sohus@jpl.nasa.gov). Phone: 818-354-6613.

**Activities:** International Planetarium Society Partnership [A28]  
Mars Viewing at Howard University Planetarium [A380]  
"MarsQuest" Planetarium Show [A5]

“Passport to the Solar System” (PTSS) [A232]  
 “Science Concepts in Context” [A235]  
 Solar System Educator Program (SSEP) [A195]  
 Space Science Workshops for Educators [A198]  
 “To Mars with MER” [A455]

## Mars Exploration Program

### B40. Mars Public Engagement (Mars E/PO)

**Description:** Mars exploration will be NASA's signature effort in planetary science over the next two decades. This program, the largest in OSS, will provide regular and frequent voyages to Mars. Such a compelling program deserves forward-looking initiatives to engage the public in Mars exploration, scientific discovery, and technological achievements. These initiatives are covered in a long-term Mars Public Engagement Plan. Just as Mars missions have been organized into a program where each element strategically complements and builds on another, the Mars Public Engagement Plan creates a focused, cohesive, highly leveraged program in its collection of planned activities. Mars public engagement is conducted at the program level, covering missions scheduled for Mars destinations over the next two decades. This organization prevents the need to reinvent the wheel with each mission, allows continuity in programming beyond the official end dates of missions, and provides the ability to develop strong, stable, and common infrastructures with long-term partners. The benefit of a 20-year plan is that public engagement initiatives will have time to bear fruit. Also, the contributions and discoveries of each mission can be intimately linked to the rich and compelling science and technology goals of the Mars Exploration Program for greater public understanding of what NASA seeks to achieve in its systematic exploration of Mars. (The term “public engagement” includes all formal education, informal education, and public information and outreach activities.) (Missions include Mariner 3-4, 6-7, and 8-9; Viking 1 and 2; Mars Pathfinder; Mars Global Surveyor; Mars Odyssey; Mars Exploration Rovers; U.S. participation in Mars Express; Mars Reconnaissance Orbiter; and Mars Science Laboratory, as well as coordination with Mars Netlander, Mars Scout, and other Mars areas that receive their E/PO funding from other sources.)

**URL:** <http://mars.jpl.nasa.gov>

**Activities:** 4-H Youth Development Program: NASA OSS E/PO Collaboration [A330]  
 Girl Scouts of the USA/NASA Collaboration [A65]  
 “Imagine Mars!” [A271]  
 International Planetarium Society Partnership [A28]  
 Mars Exploration Student Data Team [A278]  
 Mars Robotics Education Partnership [A279]  
 Mars Student Imaging Project [A280]  
 Mars Student Workshops [A281]  
 Mars Viewing at Howard University Planetarium [A380]  
 Mars: Documentary Interviews [A382]  
 Mars: Formal Educator Field Trips [A175]  
 Mars: Formal Educator Workshops [A176]  
 Mars: Informal Educator Workshops [A30]  
 Mars: Museum Visualization Alliance [A31]  
 Mars: Public Talks [A383]  
 Mars: Public Tours [A384]  
 Mars: Web Site Science, Engineering, and Educational Content Development [A385]  
 Mars: Web Spotlights [A386]  
 Mars: Zipcode Mars [A387]  
 Mars: Classroom Visits [A282]  
 Mars: Models and Exhibits [A32]  
 Mars: Museum and Other Informal Education Lectures [A33]  
 “MarsQuest” Planetarium Show [A5]  
 “MarsQuest” Traveling Exhibit [A17]  
 Maryland Space Day E/PO [A388]  
 National Engineering Week [A402]  
 “Passport to the Solar System” (PTSS) [A232]  
 “Science Concepts in Context” [A235]  
 Solar System Community Events Program [A423]

Space Science Workshops for Educators [A198]  
 "To Mars with MER" [A455]  
 West Virginia: Mars Watch E/PO Activities [A463]

#### **B41. 2001 Mars Odyssey**

**Description:** The 2001 Mars Odyssey orbiter is mapping the mineralogy and morphology of the Martian surface. It is achieving global mapping of the elemental composition of the surface and the abundance of hydrogen in the shallow subsurface. (The 2001 Mars Odyssey was launched on April 7, 2001 and arrived at Mars on October 24, 2001.)

**Lead:** Ms. Christine Johnson, NASA Jet Propulsion Laboratory, MS 264-255, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [Christine.Johnson@jpl.nasa.gov](mailto:Christine.Johnson@jpl.nasa.gov). Phone: 818-393-2634.

**URL:** <http://mars.jpl.nasa.gov/odyssey>

**Activities:** "Astro-Venture" [A89]  
 "EventScope" [A98]  
 Girl Scouts of the USA/NASA Collaboration [A65]  
 International Planetarium Society Partnership [A28]  
 Mars Image Analysis Activity [A116]  
 "Marsbound!" Mission to the Red Planet [A117]  
 "MarsQuest" Traveling Exhibit [A17]  
 "Passport to the Solar System" (PTSS) [A232]  
 "Science Concepts in Context" [A235]  
 Space Science Workshops for Educators [A198]  
 "To Mars with MER" [A455]

#### **B42. Mars Exploration Rover Mission (MER)**

**Description:** Two powerful new Mars rovers were sent on their way to the red planet. MER-A ("Spirit") was launched on June 10, 2003 and MER-B ("Opportunity") launched on July 7, 2003. MER-A landed on January 3, 2004 and MER-B on January 24, 2004. With far greater mobility than the 1997 Mars Pathfinder rover, these robotic explorers will be able to trek up to 100 meters (about 110 yards) across the surface each Martian day. Each rover will carry a sophisticated set of instruments that will allow it to search for evidence of liquid water that may have been present in the planet's past. The rovers are identical to each other but will land at different regions of Mars.

**Lead:** Ms. Michelle Viotti, NASA Jet Propulsion Laboratory, MS 301-345, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [mviotti@pop.jpl.nasa.gov](mailto:mviotti@pop.jpl.nasa.gov). Phone: 818-354-8774.

**URL:** <http://mars.jpl.nasa.gov/classroom>

**Activities:** "EventScope" [A98]  
 Girl Scouts of the USA/NASA Collaboration [A65]  
 Goldstone Apple Valley Radio Telescope (GAVRT) Classroom Implementation and Special Projects [A161]  
 International Planetarium Society Partnership [A28]  
 Mars Viewing at Howard University Planetarium [A380]  
 "Marsbound!" Mission to the Red Planet [A117]  
 "MarsQuest" Traveling Exhibit [A17]  
 MER Launch Coverage [A389]  
 Observing Events/MER Updates [A406]  
 "Passport to the Solar System" (PTSS) [A232]  
 "Science Concepts in Context" [A235]  
 Shorefest School Visits [A310]  
 "To Mars with MER" [A455]  
 "To Mars with MER"—Brokered Partnership Programs [A80]

#### **B43. Mars Global Surveyor (MGS)**

**Description:** The MGS is returning an unprecedented amount of data regarding the Martian surface features, atmosphere, and magnetic properties. Scientists are using the data gathered from this mission both to learn about the Earth by comparing it to Mars and to build a comprehensive data set to aid in planning future missions. (The MGS was launched on November 7, 1996.)

**URL:** <http://mars.jpl.nasa.gov/mgs>

**Activities:** Girl Scouts of the USA/NASA Collaboration [A65]

Mars Viewing at Howard University Planetarium [A380]  
 “MarsQuest” Traveling Exhibit [A17]  
 “Passport to the Solar System” (PTSS) [A232]  
 “Science Concepts in Context” [A235]  
 “To Mars with MER” [A455]

#### **B44. Mars Pathfinder**

**Description:** Mars Pathfinder launched December 2, 1996 and arrived on the surface of Mars on July 4, 1997. The mission was an engineering demonstration of key technologies and concepts for use in future missions to Mars; it also delivered science instruments to the surface of Mars to investigate the structure of the Martian atmosphere, surface meteorology, surface geology, form and structure, and the elemental composition of Martian rocks and soil. A small, 10-kilogram (22-pound) rover was carried on the Pathfinder and became the first rover ever to explore the Martian surface. The last communication from the spacecraft was received on September 27, 1997, and it was officially declared dead on March 10, 1998.

**URL:** <http://mpfwww.jpl.nasa.gov/default.html>

**Activities:** Mars Viewing at Howard University Planetarium [A380]  
 “Passport to the Solar System” (PTSS) [A232]  
 “Science Concepts in Context” [A235]  
 “To Mars with MER” [A455]

#### **B45. Mars Reconnaissance Orbiter (MRO)**

**Description:** MRO will focus on analyzing the surface at new scales in an effort to follow tantalizing hints of water detected in images from the Mars Global Surveyor spacecraft and to bridge the gap

between surface observations and measurements from orbit. For example the Reconnaissance Orbiter will measure thousands of Martian landscapes at 20- to 30-centimeter (8- to 12-inch) resolution, good enough to observe rocks the size of beach balls.

**URL:** <http://mars.jpl.nasa.gov/missions/future/2005-plus.html>

**Activities:** Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) Teacher Support [A149]  
 Compact Reconnaissance Imaging Spectrometer for Mars (CRISM): Student Support [A252]  
 Mars Viewing at Howard University Planetarium [A380]  
 New Horizons Public Outreach [A404]  
 New Horizons Student Support [A298]  
 “Passport to the Solar System” (PTSS) [A232]  
 “To Mars with MER” [A455]

#### **B46. Mars Science Laboratory (MSL)**

**Description:** MSL is a roving long-range, long-duration science laboratory that will be a major leap in surface measurements and pave the way for a future sample return mission. NASA is studying options to launch this mobile science laboratory mission as early as 2007. This capability will also demonstrate the technology for “smart landers” with accurate landing and hazard avoidance to reach what may be very promising but difficult to reach scientific sites.

**URL:** <http://solarsystem.nasa.gov/missions/profile.cfm?Sort=Chron&Mission=MarsSciLab>

**Activities:** Mars Viewing at Howard University Planetarium [A380]  
 Maryland Space Day E/PO [A388]  
 “Passport to the Solar System” (PTSS) [A232]  
 “To Mars with MER” [A455]  
 West Virginia: Mars Watch E/PO Activities [A463]

#### **B47. Viking**

**Description:** NASA's Viking project found a place in history when it became the first mission to land a spacecraft safely on the surface of another planet. Two identical spacecraft, each consisting of a lander and an orbiter, were built. Each orbiter-lander pair flew together and entered Mars orbit; the landers then separated and descended to the planet's surface. The Viking 1 lander touched down on the western slope of Chryse Planitia (the Plains of Gold), while the Viking 2 lander settled down at Utopia Planitia. Besides taking photographs and collecting other science data on the Martian surface, the two landers conducted three biology experiments designed to look for possible signs of life. These experiments discovered unexpected and enigmatic chemical activity in

the Martian soil, but these provided no clear evidence for the presence of living microorganisms in the soil near the landing sites. According to scientists, Mars is self-sterilizing. They believe the combination of solar ultraviolet radiation that saturates the surface, the extreme dryness of the soil, and the oxidizing nature of the soil chemistry prevent the formation of living organisms in Martian soil. The Viking mission was planned to continue for 90 days after landing. Each orbiter and lander operated far beyond its design lifetime. Viking Orbiter 1 functioned until July 25, 1978, while Viking Orbiter 2 continued for 4 years and 1,489 orbits of Mars, concluding its mission on August 7, 1980. Because of the variations in available sunlight, both landers were powered by radioisotope thermoelectric generators—devices that create electricity from heat given off by the natural decay of plutonium. That power source allowed long-term science investigations that otherwise would not have been possible. The last data from Viking 2 Lander arrived at Earth on April 11, 1980. Viking 1 Lander made its final transmission to Earth on November 11, 1982.

URL: <http://www.jpl.nasa.gov/missions/past/viking.html>

Activities: "Passport to the Solar System" (PTSS) [A232]

"Science Concepts in Context" [A235]

"To Mars with MER" [A455]

## New Frontiers

### B48. New Horizons

**Description:** New Horizons is a mission to the unexplored edge of our Solar System, designed to provide the first close look at Pluto, Charon and their icy, rocky relatives in the Kuiper Belt. Scheduled to launch in 2006 and reach Pluto-Charon by 2015, New Horizons will be the first NASA planetary spacecraft in two decades to train its instruments on a "new" world. The New Horizons payload is designed to answer critical questions about Pluto, Charon, and the other unexplored bodies in the outer Solar System, such as how the bodies look, what they are made of, and what their atmospheres are like. The mission plans to map surface appearance with visible-wavelength cameras; study surface composition by spectra in the near infrared; and probe atmospheres in detail with ultraviolet spectrometers and radio waves. The New Horizons E/PO plan includes educator training, education programs and curriculum modules, a mission Web site, broadcast events, student press conferences and a guest observer program. Public awareness efforts include co-sponsored lectures, informal programs, and exhibits at science museums nationwide. The E/PO program also includes the Student Dust Counter, a special instrument designed by students at the University of Colorado at Boulder. The device, which will detect dust grains produced by collisions between asteroids, comets and Kuiper Belt objects during New Horizons' journey, will be the first science instrument on a NASA planetary mission to be designed, built, and flown by students.

**Lead:** Ms. Kerri Beisser, Johns Hopkins Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099. E-mail: [kerri.beisser@jhuapl.edu](mailto:kerri.beisser@jhuapl.edu). Phone: 443-778-6050.

**Contact:** Linda Butler, Johns Hopkins Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099.

**URL:** <http://www.pluto.jhuapl.edu>

**Activities:** New Horizons Public Outreach [A404]

New Horizons Student Support [A298]

## Discovery

### B49. Discovery Program Support Office (DPSO)

**Description:** NASA's Discovery program is comprised of a series of highly focused, competitively selected planetary science investigations. Discovery missions aim to enhance our understanding of the Solar System by exploring the planets, their moons, and other small bodies using innovative approaches to assure the highest science value for the cost. Ten missions have been selected since the program began in 1992. Discovery program E/PO efforts are designed to promote the program and awareness of the missions. This is done through a Web site, a quarterly newsletter, the development of outreach products and informational materials, and giving presentations in a variety of venues. The Discovery program works with Discovery mission E/PO personnel to identify and develop E/PO opportunities, coordinate with the program, and assure that mission activities are consistent with NASA Space Science E/PO strategy.

**Lead:** Ms. Shari Asplund, NASA Jet Propulsion Laboratory, 180-201, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [shari.e.asplund@jpl.nasa.gov](mailto:shari.e.asplund@jpl.nasa.gov). Phone: 818-354-7280.

**URL:** <http://discovery.nasa.gov>



Activities: Debut of Discovery Program Video, "Unlocking the Mysteries" [A355]  
Shorefest School Visits [A310]

### **B50. Comet Nucleus Tour (CONTOUR)**

Description: The E/PO efforts of the CONTOUR mission have been aimed at bringing the thrill of exploration and the wonder of discovery into classrooms and homes through unique educational experiences. We invite teachers, students, and the public to participate in scientific inquiry, discovery, and insight into the complex and awesome nature of comets. Through media, the Internet, and classroom curriculum we reach out to the educational community and the public to inspire their curiosity and satisfy their interests in the study of comets. Although the CONTOUR spacecraft was lost, information on the mission science, education, and outreach continues to be made available.

Contact: Ms. Kathy May, Cornell University, Ithaca, NY 14853. E-mail: [kathym@astrosun.astro.cornell.edu](mailto:kathym@astrosun.astro.cornell.edu).  
Phone: 607-255-8542.

URL: <http://www.contour2002.org>

Activities: "Passport to the Solar System" (PTSS) [A232]  
"Science Concepts in Context" [A235]

### **B51. Deep Impact**

Description: The Deep Impact mission outreach plan specializes in five audiences: educators, students, public (including informal), the underserved, and amateur astronomers.

Contact: Ms. Maura Rountree-Brown, NASA Jet Propulsion Laboratory, 264-850, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [Maura.Rountree-Brown@jpl.nasa.gov](mailto:Maura.Rountree-Brown@jpl.nasa.gov). Phone: 818-393-4897.

URL: <http://deepimpact.jpl.nasa.gov>

Activities: 4-H Youth Development Program: NASA OSS E/PO Collaboration [A330]  
Deep Impact Web Site [A356]  
Deep Impact: Amateur Astronomers Partnership [A357]  
Deep Impact: Educator Training [A152]  
Deep Impact: Public/Informal Events [A358]  
Deep Space Network Minority Outreach [A61]  
Girl Scouts of the USA/NASA Collaboration [A65]  
High-Power Activity [A99]  
Solar System Community Events Program [A423]  
Towards Other Planetary Systems (TOPS) Astronomy Workshop [A214]

### **B52. Genesis**

Description: Genesis is a sample recovery mission designed to provide the data needed to achieve a better understanding of the original building blocks of the Solar System. The mission captures pieces of the Sun (ion by ion) in ultra-pure materials. The captured sample will be returned to Earth in an airtight capsule, which will float toward the surface of the Earth via a parafoil. At an approximate altitude of 8,000-10,000 feet the parafoil will be captured using a special technique with helicopters. These samples will be opened at the "cleanest" clean room at NASA's Johnson Space Center. A small portion of the sample will be analyzed there in new state of the art facilities being built as part of the project. The remainder will be held and distributed over the remainder of the century to laboratories capable of making similar measurements. Genesis E/PO is also operated in a unique manner. The project has contracted with a Department of Education (DOE) Laboratory and McREL (Mid-Continent Research in Education and Learning). McREL, sited in Aurora Colorado has a lead role in DOE in learning and standards based education. So far, over the course of our Mission, McREL has produced over 10 large educational modules (each composed of approximately 50-100 pages) of standards-based, field-tested materials. McREL has also designed and implemented an award winning Web site for the mission. Each month this page receives in excess of one million hits, relating to over 45,000 visits, primarily by educators.

Lead: Mr. Aimee Whalen, NASA Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [aimee.whelen@jpl.nasa.gov](mailto:aimee.whelen@jpl.nasa.gov). Phone: 818-354-3245.

URL: <http://genesismission.jpl.nasa.gov>

Activities: Genesis Classroom/Student Presentations [A260]  
Genesis Conference Workshops [A159]  
Genesis: Education Events/Exhibits [A364]  
"Passport to the Solar System" (PTSS) [A232]  
Professional/Academic Presentations [A409]

**B53. Lunar Prospector**

**Description:** The Lunar Prospector (LP) was launched in January 1998 to study the Earth's moon. The Lunar Prospector critical science objectives were to "prospect" the lunar crust and atmosphere for potential resources, including minerals, water ice and certain gases; map the Moon's gravitational and magnetic fields; and learn more about the size and content of the Moon's core. In July 1999, the Lunar Prospector impacted the Moon near its south pole in a controlled crash to look for evidence of water ice (none was observed).

**URL:** <http://nssdc.gsfc.nasa.gov/planetary/lunarprosp.html>

**Activities:** "Astro-Venture" [A89]

**B54. Mercury Surface, Space Environment, Geochemistry, and Ranging****MESSENGER)**

**Description:** MESSENGER is a scientific investigation of the planet Mercury. Understanding Mercury and the forces that have shaped it is fundamental to understanding the terrestrial planets and their evolution. MESSENGER is a mission to orbit Mercury following two fly-bys of that planet. MESSENGER will investigate key scientific questions regarding Mercury's characteristics and environment during these two complementary mission phases. Data will be provided by an optimized set of miniaturized space instruments and the spacecraft's telecommunications system. MESSENGER will enter Mercury's orbit in April 2009 and carry out comprehensive measurements for one year. Data collection will conclude in April 2010. Working in close coordination with the mission's science team, a carefully selected group of E/PO professionals has been designing a comprehensive set of activities to coordinate with MESSENGER events. The activities are designed for K-college education and public interest. These activities include teacher training, curriculum development, unique student investigations and experiments related to MESSENGER, a television documentary, museum displays, and special outreach to underserved and minority students. The full multi-faceted E/PO program is carried out with an extensive network of individual and institutional partners throughout the country. The E/PO effort is organized around overarching themes that reflect the science, engineering, technology, and people of the mission. The MESSENGER themes are Comparative Planetology, The Solar System through History, and Framing Pathways to Answers: The Scientific Process in Action. The thematic framework is also informed by both content and pedagogy standards articulated in the National Science Education Standards and Benchmarks for Science Literacy. For the duration of the mission, the E/PO team will create and disseminate materials that focus on telling MESSENGER's many stories to a broad and diverse audience.

**Lead:** Ms. Stephanie Stockman, Science Systems and Applications, Inc., NASA GSFC Code 921, Greenbelt, MD 20771, 5900 Princess Garden Parkway, Suite 300, Lanham, MD 20706.  
E-mail: [stockman@core2.gsfc.nasa.gov](mailto:stockman@core2.gsfc.nasa.gov). Phone: 301-614-6457.

**URL:** <http://messenger.jhuapl.edu>

**Activities:** Ice in the Solar System Interactive CDROM [A106]  
MESSENGER Education Module, "Staying Cool" [A118]  
New Horizons Public Outreach [A404]  
New Horizons Student Support [A298]  
"Passport to the Solar System" (PTSS) [A232]  
"Science Concepts in Context" [A235]  
TIMED Student Support [A324]

**B55. Near-Earth Asteroid Rendezvous (NEAR)**

**Description:** As the first spacecraft to orbit and land on an asteroid, the NEAR mission continues to answer fundamental questions about the nature and origin of near-Earth objects. These objects are the primary source of large bodies that collide with Earth, and primitive asteroids, comets, and meteorites also preserve clues to the nature of early Solar System processes and conditions. These clues have been altered or destroyed on large, planet-size bodies by processes of planetary evolution. (NEAR was launched in February 1996; asteroid landing and final communication occurred in February 2001.)

**Lead:** Ms. Kerri Beisser, Johns Hopkins Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099. E-mail: [kerri.beisser@jhuapl.edu](mailto:kerri.beisser@jhuapl.edu). Phone: 443-778-6050.

**URL:** <http://near.jhuapl.edu>

**Activities:** Adler After School [A240]  
NEAR Student Support [A295]  
New Horizons Public Outreach [A404]  
New Horizons Student Support [A298]

"Passport to the Solar System" (PTSS) [A232]

"Science Concepts in Context" [A235]

### **B56. Stardust**

**Description:** The Stardust education Web site is designed to enhance the breadth, flexibility and knowledge of science, mathematics, and technology between K–12 education and higher education, recognizing and supporting a diverse set of programs while improving scientific literacy among students. The materials found on this home-page are aligned with the National Science Education Standards and have been designed primarily for use by grades 5–8. The Stardust E/PO team is composed of many partners which include the Challenger Center for Space Science Education, the JASON Foundation for Education, Omniplex at the Kirkpartick Science and Air Space Museum, Space Explorers, Inc., Virginia Space Grant Consortium, Parents and Children as Co-Travelers (PACCT), the NASA's Jet Propulsion Laboratory (JPL) Ambassadors Program, the JPL Solar System Educator Program, the "From the Sun to the Star Nations" Native American outreach initiative, and Space Place. The Stardust mission participates and sponsors teacher training and curriculum development programs targeted for minorities and underserved communities along with the public at large. Other resources available include an interactive Web site, an educational planetarium program, video animation, and library and museum exhibits.

**Lead:** Ms. Aimee Whalen, NASA Jet Propulsion Laboratory, MS: 264-379, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [aimee.l.whelen@jpl.nasa.gov](mailto:aimee.l.whelen@jpl.nasa.gov). Phone: 818-354-3245.

**URL:** <http://stardust.jpl.nasa.gov>

**Activities:** Deep Space Network Minority Outreach [A61]  
 "Passport to the Solar System" (PTSS) [A232]  
 "Science Concepts in Context" [A235]  
 Solar System Community Events Program [A423]  
 Stardust Formal Education [A316]  
 Stardust Informal Outreach [A42]  
 Stardust Public Outreach [A444]  
 Stardust Target Groups [A445]

## **Other NASA Programs**

### **B57. Astromaterials Program**

**Description:** The Astromaterials program at NASA's Johnson Space Center curates and distributes samples of other bodies in the Solar System to researchers around the world. Astromaterials include samples collected by NASA missions (e.g., Apollo Moon rocks, Genesis solar wind ions, Stardust comet particles) and samples collected on Earth (e.g., meteorites from Antarctica, cosmic dust from the stratosphere). Astromaterials E/PO focuses on the scientific study of extraterrestrial materials and their use in education. The program is based on collaboration between scientists at Johnson and educators. A long-term example is the distribution of lunar and meteorite samples to schools through partnerships with the NASA Office of Education. Recent major projects include: (1) development of classroom activities in partnership with K–12 teachers, and presentation of the activities in teacher workshops; (2) collaboration with two minority universities on a Houston-wide outreach program; and (3) development of exhibits and planetarium shows in partnership with museums.

**Lead:** Dr. Marilyn Lindstrom, NASA Johnson Space Center, SR, 2101 NASA Road 1, Houston, TX 77058. E-mail: [marilyn.lindstrom-1@nasa.gov](mailto:marilyn.lindstrom-1@nasa.gov). Phone: 281-483-5135.

**URL:** <http://curator.jsc.nasa.gov>

**Activities:** 4-H Youth Development Program: NASA OSS E/PO Collaboration [A330]  
 Astromaterials Sample Distribution [A221]  
 Astromaterials-Astrobiology Student Presentations [A242]  
 "Exploring the Solar System": Teacher Workshops [A158]  
 Girl Scouts of the USA/NASA Collaboration [A65]  
 NASA Astrobiology Institute/Johnson Space Center: Minority and Underrepresented E/PO [A69]  
 NASA Johnson Space Center Curation Facility Tours for Educators [A180]  
 "Rocks from Space": Teacher Workshops [A192]  
 Solar System Community Events Program [A423]

### **B58. Deep Space 1 (New Millennium) (DS1)**

**Description:** The Space Place has involved DS1 in the following events/activities: we attend conferences to promote Space

Place and all of the projects involved with the Web site. Usually, mission or Space Place related items are passed out. Libraries, science museums, planetariums, zoos and aquariums across the nation have formed "Club Space Place" partnerships with NASA. They get Space Place-provided display materials, an activity guide and handouts for an original group activity. Through these partnerships, we promote the Space Place Web site and NASA Jet Propulsion Laboratory missions. Club Space Place provides quarterly interdisciplinary hands-on activities that are space or Earth science related. These quarterly activities go to the Space Place library and museum partners, Boys & Girls Clubs of America, the YWCA, and the Civil Air Patrol. Presently there are 272 partners reaching thousands of children. On a monthly basis, Space Place provides articles for over 20 newspapers nationwide in both English and Spanish. The combined readership for these newspapers totals more than 2.5 million. The articles end with information on activities and a link to the Space Place Web site and NASA mission Web sites. Diane Fisher submits articles to "Technology and Children" magazine four times a year, and to "The Technology Teacher" magazine eight times a year. Each article, published under the Space Place insignia, refers to a particular mission. "Technology and Children" reaches an estimated 1,400 teachers and their students (up to 42,000 children), and "The Technology Teacher" reaches an estimated 8,000 teachers and their students (up to 224,000 children). Each article is also posted on ITEA's Web site, which reaches an even wider audience. The Space Place Web site is a dynamic site that offers interactive experiences and fun facts for children and adults. Space Place is supported by the New Millennium program. The reaches an average of 3,000 Web users a day.

Lead: Ms. Nancy Leon, NASA Jet Propulsion Laboratory, M/S 171-350, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [Nancy.J.Leon@jpl.nasa.gov](mailto:Nancy.J.Leon@jpl.nasa.gov). Phone: 818-354-1067.

URL: <http://spaceplace.nasa.gov>

Activities: Girl Scouts of the USA/NASA Collaboration [A65]  
"Science Concepts in Context" [A235]

### **B59. Deep Space Mission System (DSMS)**

Description: The DSMS incorporates the Deep Space Network (DSN) and the infrastructure, software, and systems which support it. The goal of the DSMS E/PO is to build awareness of the critical role communication plays in Solar System exploration. Without a means of communicating between spacecraft and Earth to relay commands and return science data, there could be no exploration. Frequent collaborations with NASA Jet Propulsion Laboratory (JPL) missions using the DSMS tell this story, while previously produced printed materials and videos are distributed to educators and to the public to offer further explanation. DSMS partners with JPL programs (Solar System Ambassadors, Solar System Educators, and a Native American initiative) to provide wider distribution of information and educational activities. The DSN is also used for science observation through radio astronomy, and one of the decommissioned 34-meter antennas is now part of an innovative educational program, the Goldstone Apple Valley Radio Telescope (GAVRT). Students can control this huge antenna via the Internet from their classrooms to gather and analyze data which is ultimately used by scientists at JPL.

Lead: Ms. Shirley Wolff, NASA Jet Propulsion Laboratory, 303-401, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [shirley.e.wolff@jpl.nasa.gov](mailto:shirley.e.wolff@jpl.nasa.gov). Phone: 818-354-4069.

URL: <http://deepspace.jpl.nasa.gov/dsn>

Activities: "Capturing Whispers From Space" [A93]  
Deep Space Network (DSN) Educational Activities [A253]  
Deep Space Network Conference Workshops and Exhibits [A153]  
Deep Space Network Minority Outreach [A61]  
Deep Space Network Public Events [A359]  
Girl Scouts of the USA/NASA Collaboration [A65]  
Goldstone Apple Valley Radio Telescope (GAVRT) Classroom Implementation and Special Projects [A261]  
Goldstone Apple Valley Radio Telescope (GAVRT)—Classroom Implementation [A262]  
Goldstone Apple Valley Radio Telescope (GAVRT)—Scientist Telecons [A263]  
Goldstone Apple Valley Radio Telescope (GAVRT): Educational Conference Workshops and Exhibits [A161]  
Goldstone Apple Valley Radio Telescope (GAVRT): Scientist School Visits [A264]  
Goldstone Apple Valley Radio Telescope (GAVRT): Teacher Training [A162]  
Goldstone Apple Valley Radio Telescope: Public Outreach Activities [A366]  
Goldstone Communications Complex: Educational Activities [A265]  
Goldstone Communications Complex: Public Tours [A367]  
Goldstone Communications Complex: Student Tours [A266]  
Goldstone Deep Space Communications Complex: Public Outreach [A368]  
International Planetarium Society Partnership [A28]

### **B60. Jupiter Icy Moons Orbiter (JIMO)**

**Description:** The Jupiter Icy Moons Orbiter is an ambitious proposed mission to orbit three planet-sized moons of Jupiter—Callisto, Ganymede and Europa—which may harbor vast oceans beneath their icy surfaces. The mission would launch in 2012 or later.

**URL:** <http://www.jpl.nasa.gov/jimo>

**Activities:** “Astro-Venture” [A89]

### **B61. Lunar and Planetary Institute (LPI)**

**Description:** The Lunar and Planetary Institute (LPI) provides a bridge between NASA’s Solar System scientific missions and the academic community. Through the Institute, visiting and staff scientists participate in studies of the current state, evolution, and formation of our Solar System. Resources at the LPI include a computing center, library, collections of lunar and planetary data, an image-processing facility, and publishing and conference services. The E/PO department focuses on providing access to current discoveries and knowledge about our Solar System through a variety of programs for the formal and informal education realms. Examples include programs designed to bring space science activities and resources into public and school library settings; planetarium programs exploring space science through Native American legends; educator workshops sharing current Solar System research; hands-on classroom activities developed in collaboration with staff scientists; and public outreach events geared toward young children, families, and older students/adults.

**Lead:** Dr. Stephanie Shipp, Lunar and Planetary Institute, 3600 Bay Area Boulevard, Houston, TX 77058-1113. E-mail: [shipp@lpi.usra.edu](mailto:shipp@lpi.usra.edu). Phone: 281-486-2109.

**URL:** <http://www.lpi.usra.edu>

**Activities:** “Explore! Fun with Science” [A361]  
 Exploring the Solar System: Ryder Program [A256]  
 Mars Viewing Event [A381]  
 SkyTellers [A41]  
 “The Great Desert”: Geology and Life on Mars and in the Southwest [A211]

## **International Missions with NASA Participation**

### **B63. Mars Express**

**Description:** NASA is participating in a mission planned by the European Space Agency and the Italian Space Agency called Mars Express, which will explore the atmosphere and surface of Mars from polar orbit. NASA’s involvement includes joint development of the radar instrument with the Italian Space Agency, support of U.S. science co-investigators, coordination of radio relay systems to make sure that different spacecraft will operate with each other, a hardware contribution to the energetic neutral atoms analyzer instrument, and the provision of backup tracking support during critical mission phases by NASA’s Deep Space Network. Our contribution to the energetic neutral atoms analyzer instrument is called ASPERA-3. ASPERA-3 was selected as a Discovery mission of opportunity; the complete instrument will study the interaction between the solar wind and the atmosphere of Mars, and it will attempt to determine what happened to the large amount of water that was once on Mars. The co-investigator being funded by NASA is Dr. David Winningham of the Southwest Research Institute, San Antonio, TX.

**Activities:** Mars Viewing at Howard University Planetarium [A380]  
 “MarsQuest” Traveling Exhibit [A5]  
 “Passport to the Solar System” (PTSS) [A232]  
 “Science Concepts in Context” [A235]  
 “To Mars with MER” [A455]

### **B64. Rosetta**

**Description:** Rosetta is a European Space Agency cometary mission. The satellite will rendezvous with a comet and orbit it, while taking scientific measurements. A Surface Science Package (SSP) will be landed on the comet surface to take in situ measurements. The United States is providing science instruments for the orbiter.

**Activities:** “Science Concepts in Context” [A235]



## STRUCTURE AND EVOLUTION OF THE UNIVERSE MISSIONS

### Major Missions

#### B65. Chandra X-Ray Observatory (CXO)

**Description:** The Chandra X-Ray Observatory, the third of NASA's "Great Observatories," has completed its fourth year of science operations. Chandra's superb resolution has enabled never-before-seen images of the X-ray emission from such fascinating cosmic sources as the sound waves produced by a black hole, a pair of black holes orbiting in the nucleus of an active galaxy, and the jets and rings of high energy particles in the remnants of exploded stars. The goals of the Chandra E/PO program are to increase the public's engagement with NASA space science by conveying the excitement of the Chandra discoveries; promoting science literacy by engaging the imaginations of students, educators, and the public; increasing learning opportunities in science, math and technology with classroom-ready materials that are aligned with national standards; and providing ready access to Chandra images and education products. The program maintains an extensive public Web site with images, background materials, and education products that are downloadable in multiple formats. The Web site is now fully compliant with Federal Section 508 guidelines for visual impairments. Online forms allow educators to order printed and multimedia resources. Opportunities for educators include summer workshops at Tufts University's Wright Center for Science Education, the Rutgers Astrophysics Summer Institute, programs at national and state teachers' conferences, and the Chandra Teacher Resource Agent Program. Printed materials and a CD, containing Chandra images, are distributed widely to classrooms, planetariums, and amateur astronomy associations. Classroom ready materials are downloadable from the E/PO web site. For greater educational impact, an effort is made to present Chandra images in multi-wavelength comparisons. A software program tailored for educational use enables students and teachers to work with actual Chandra data and images.

**Lead:** Ms. Kathleen Lestition, Harvard-Smithsonian Center for Astrophysics, MS 06, 60 Garden Street, Cambridge, MA 02138. E-mail: [klestition@cfa.harvard.edu](mailto:klestition@cfa.harvard.edu). Phone: 617-495-7399.

**URL:** <http://chandra.harvard.edu>

**Activities:** A Star in Our Neighborhood [A331]  
 Adler After School [A240]  
 "Bright Lights, Big City": Massive Galaxies and Supermassive Black Holes [A147]  
 Chandra Multi-Wavelength Postcards [A94]  
 Chandra Student Research at the Pisgah Astronomical Research Institute (PARI) Observatory [A247]  
 Chandra X-Ray Center Operation Control Center Tours [A345]  
 Chandra X-Ray Center Presentations and Workshops for Students [A248]  
 Chandra X-Ray Center Teacher Workshops and Presentations [A148]  
 Chandra X-Ray Center: Online Education and Outreach [A346]  
 Chandra X-Ray Center: Public Outreach [A347]  
 Chandra-Science After-School Initiative [A249]  
 "Cosmic Journeys" Collectible Card Game: Educator Workshop [A150]  
 "Cosmic Questions" Informal Science: Midland Michigan [A353]  
 "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A9]  
 MIT Center for Space Research Informal Education [A283]  
 MIT Center for Space Research Public Outreach [A390]  
 MIT Chandra/Gear Up Summer Program [A284]  
 "Passport to the Solar System" (PTSS) [A232]  
 Penn State Inservice Workshops in Astronomy [A188]  
 Public Presentations by New England Space Scientists [A410]  
 "Science Concepts in Context" [A235]  
 SEU Forum: Mission Support [A417]  
 Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]  
 "The Cosmos is the Classroom" [A210]

#### B66. Compton Gamma-Ray Observatory (CGRO)

**Description:** CGRO, the second of NASA's "Great Observatories," was launched in April 1991. It had a diverse scientific agenda, including studies of very energetic celestial phenomena such as solar flares, cosmic gamma-ray bursts, pulsars, nova and supernova explosions, accreting black holes of stellar dimensions, quasar emissions,

and interactions of cosmic rays with the interstellar medium. Compton left a legacy of outstanding science and revolutionized our knowledge of the gamma-ray sky. Its mission ended in June 2000, when it was de-orbited following the failure of one of its three gyroscopes.

Activities: "Passport to the Solar System" (PTSS) [A232]  
"Science Concepts in Context" [A235]

### **B67. Constellation-X**

Description: Constellation-X has been designed to perform x-ray spectroscopy with unprecedented sensitivity and spectral resolution. The measurement of large numbers of x-ray spectral lines in hot plasmas leads to determining the elemental composition, temperature, and velocity of the emitting matter. Astronomers will determine the flow of gas in accretion disks around black holes in active galactic nuclei and in binary x-ray sources, measure the population of newly created elements in supernova remnants, and detect the influence of dark matter on the hot intergalactic medium in clusters of galaxies. Constellation-X is identified in the Office of Space Science strategic plan.

Activities: "Cosmic Journeys" Collectible Card Game: Educator Workshop [A150]  
"Passport to the Solar System" (PTSS) [A232]  
"Science Concepts in Context" [A235]  
Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]

### **B68. Gamma-Ray Large Area Space Telescope (GLAST)**

Description: GLAST is scheduled for launch in late 2006. With GLAST, scientists hope to explore the limits of gravity and energy in the Universe, and study nature's highest energy acceleration processes. The instruments aboard GLAST have an imaging gamma-ray telescope that is vastly more capable than the instruments flown previously, as well as a secondary instrument to augment the study of gamma-ray bursts. The GLAST E/PO group has developed a program to promote inquiry into the origin and structure of the Universe and the fundamental relationship between energy and matter, concepts which are included in the Physical Science Content Standards A, B, and D for grades 9–12. The GLAST Telescope Network (GTN) is being designed to provide information to ground-based visible light telescopes in conjunction with space-based observations of events producing gamma rays; as well as the development of a ground-based imaging and data archive. The GLAST Educator Ambassador Program consists of 10 educators, who will work in conjunction with GLAST science and E/PO team members at SSU and Stanford Linear Accelerator (SLAC) to develop workshops and curriculum materials. Many printed materials are being developed including TOPS Lesson Modules and posters accompanied by educator guides. The GLAST E/PO group also maintains a public-oriented Web site that includes an "Ask a Scientist" feature. Among future programs is an Interactive Gamma-Ray Detector Exhibit under development at Stanford Linear Accelerator's Virtual Visitor Center and additional Space Mysteries, interactive video games that teach physical science and mathematics. Also in development with Thomas Lucas Productions is a NOVA or PBS special that takes a sweeping look at high-energy astrophysics.

Lead: Dr. Lynn Cominsky, Sonoma State University, Department of Physics and Astronomy, 1801 East Cotati Avenue, Rohnert Park, CA 94928. E-mail: [lynnc@charmian.sonoma.edu](mailto:lynnc@charmian.sonoma.edu). Phone: 707-664-2655.

URL: <http://glast.gsfc.nasa.gov>

Activities: "Cosmic Journeys" Collectible Card Game: Educator Workshop [A150]  
"Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A9]  
"Exploring the Extreme Universe!": Student Presentations [A254]  
GLAST High-Energy Classroom Teacher Workshops [A160]  
GLAST: Public Presentations [A365]  
SEU Forum: Mission Support [A417]  
Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]  
XMM-Newton High-Energy Classroom Teacher Workshops [A218]

### **B69. Gravity Probe B Relativity Mission (GP-B)**

Description: GP-B is producing and distributing educational materials that communicate the science and technology related to the mission, including Einstein's General Theory of Relativity. In addition, GP-B is participating in conferences and workshops to teach students, teachers and the general public about GP-B. Materials include posters, an educator's guide, lithograph sets, a DVD video, and brochures. Most materials are available on the GP-B Web site. Additionally, the GP-B Web site is developing a "Spacetime and Relativity" section to introduce and educate users about these concepts.

Lead: Mr. Shannon Range, Stanford University, HEPL 4085, Stanford, CA 94305. E-mail: [www@relgyro.stanford.edu](http://www@relgyro.stanford.edu).

Contact: Ms. Jennifer Spencer, Stanford University, HEPL 4085, Stanford, CA 94305. E-mail: [www@relgyro.stanford.edu](mailto:www@relgyro.stanford.edu).  
 URL: <http://einstein.stanford.edu>  
 Activities: "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A9]  
 Examining Einstein's Spacetime with Gravity Probe-B [A157]  
 SEU Forum: Mission Support [A417]  
 Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]

### **B70. Laser Interferometer Space Antenna (LISA)**

Description: The Space Place has involved LISA in various events/activities. We attend conferences to promote Space Place and all of the projects involved with the Web site. Usually, mission- or Space Place-related items are passed out. Libraries, science museums, planetariums, zoos and aquariums across the United States have formed "Club Space Place" partnerships with NASA. They get Space Place-provided display materials, an activity guide, and handouts for an original group activity. Through these partnerships we promote the Space Place Web site and NASA missions. Club Space Place provides quarterly interdisciplinary hands-on activities that are space or Earth science related. These quarterly activities go to the Space Place library and museum partners, Boys & Girls Clubs of America, YWCA, and the Civil Air Patrol. Presently there are 272 partners reaching thousands of children. On a monthly basis, Space Place provides articles for over 20 newspapers nationwide in both English and Spanish. The combined readership of these newspapers adds up to more than 2.5 million. The articles always end with information on activities and a link to the Space Place Web site and OSS mission Web sites. Diane Fisher submits articles to "Technology and Children" magazine four times a year, and articles to "The Technology Teacher" magazine eight times a year. Each article, published under the Space Place header, refers to a particular mission. Each "Technology and Children" publication reaches an estimated 1,400 teachers and their students (possibly 42,000 children), and each "The Technology Teacher" publication reaches an estimated 8,000 teachers and their students (possibly 224,000 children). Each article is also posted on ITEA's Web site, which reaches an even wider audience. The Space Place Web site is a dynamic site that offers interactive experiences and fun facts for children and adults. The Space Place is supported by the New Millennium Program. It reaches an average of 3,000 web users per day.

Lead: Ms. Nancy Leon, NASA Jet Propulsion Laboratory, M/S 171-350, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [Nancy.J.Leon@jpl.nasa.gov](mailto:Nancy.J.Leon@jpl.nasa.gov). Phone: 818-354-1067.

URL: <http://spaceplace.nasa.gov>

Activities: Amateur Astronomy Club Activity [A335]  
 Center for Gravitational Wave Astronomy [A60]  
 "Cosmic Journeys" Collectible Card Game: Educator Workshop [A150]  
 SEU Forum: Mission Support [A417]  
 Space Place: Newspaper Articles [A431]  
 Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]

## **Explorers**

### **B72. Cosmic Hot Interstellar Plasma Spectrometer (CHIPS)**

Description: CHIPS uses an extreme ultraviolet spectrograph during its mission to study the "Local Bubble," a tenuous cloud of hot gas surrounding our Solar System that extends about 300 light-years from the Sun. The million degree gas in this region is thought to be generated by supernovas and stellar winds from hot, young stars. But the origins and cooling mechanisms of the gas in the Local Bubble still need to be understood. CHIPS, the first University Class Explorer (UNEX), was launched in January 2003. The CHIPS E/PO program has developed classroom materials and lessons focusing on the fundamental physics concepts behind the mission. These are disseminated through teacher workshops, public events, NASA education networks, and a Web site.

Lead: Dr. Nahide Craig, University of California, Berkeley, MC 7450, Berkeley, CA 94720. E-mail: [ncraig@ssl.berkeley.edu](mailto:ncraig@ssl.berkeley.edu). Phone: 510-643-7273.

Contact: Dr. Bryan Mendez, University of California, Berkeley, MC 7450, Berkeley, CA 94720. E-mail: [bmendez@ssl.berkeley.edu](mailto:bmendez@ssl.berkeley.edu). Phone: 510-643-2178.

URL: [http://cse.ssl.berkeley.edu/chips\\_epo](http://cse.ssl.berkeley.edu/chips_epo)

Activities: CHIPS Classroom Visits and Student Support [A250]  
 CHIPS: Public Outreach and Informal Education [A349]  
 CHIPS: Scientist Involvement in E/PO [A350]  
 Cosmic Hot Interstellar Plasma Spectrometer (CHIPS) Curriculum Dissemination [A223]

Cosmic Hot Interstellar Plasma Spectrometer (CHIPS) Science Investigation: Exploring the Interstellar Medium [A95]  
 "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A9]  
 RHESSI Teacher Professional Development [A191]  
 RHESSI: Public Outreach and Informal Education [A411]  
 SEC Forum: Informal and Public Outreach [A415]  
 SEU Forum: Mission Support [A417]  
 SPIDR Teacher Professional Development Workshops [A199]  
 Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]  
 Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A206]

### **B73. Extreme Ultraviolet Explorer (EUVE)**

**Description:** The EUVE astronomy mission operated in the largely unexplored extreme ultraviolet (70-760  $\text{\AA}$ ) band. The science payload consisted of three grazing incidence scanning telescopes and an extreme ultraviolet (EUV) spectrometer/deep survey instrument. The spacecraft was launched in June 1992 and was completely successful, exceeding its science goals. EUVE was turned off in January 2001.

**Activities:** "Passport to the Solar System" (PTSS) [A232]

### **B74. Galaxy Evolution Explorer (GALEX)**

**Description:** The Space Place has involved GALEX in the following events/activities. We attend conferences to promote Space Place and all of the projects involved with the Web site. Usually, mission- or Space Place-related items are passed out. Libraries, science museums, planetariums, zoos and aquariums across the United States have formed "Club Space Place" partnerships with NASA. They get Space Place-provided display materials, an activity guide, and handouts for an original group activity. Through these partnerships we promote the Space Place Web site and NASA missions. Club Space Place provides quarterly interdisciplinary hands-on activities that are space or Earth science related. These quarterly activities go to the Space Place library and museum partners, Boys & Girls Clubs of America, YWCA, and the Civil Air Patrol. Presently there are 272 partners reaching thousands of children. On a monthly basis, Space Place provides articles for over 20 newspapers nationwide in both English and Spanish. The combined readership of these newspapers adds up to more than 2.5 million. The articles always end with information on activities and a link to the Space Place Web site and OSS mission Web sites. Diane Fisher submits articles to "Technology and Children" magazine four times a year, and articles to "The Technology Teacher" magazine eight times a year. Each article, published under the Space Place header, refers to a particular mission. Each "Technology and Children" publication reaches an estimated 1,400 teachers and their students (possibly 42,000 children), and each "The Technology Teacher" publication reaches an estimated 8,000 teachers and their students (possibly 224,000 children). Each article is also posted on ITEA's Web site, which reaches an even wider audience. The Space Place Web site is a dynamic site that offers interactive experiences and fun facts for children and adults. The Space Place is supported by the New Millennium Program. It reaches an average of 3,000 web users per day.

**Lead:** Ms. Nancy Leon, NASA Jet Propulsion Laboratory, M/S 171-350, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [Nancy.J.Leon@jpl.nasa.gov](mailto:Nancy.J.Leon@jpl.nasa.gov). Phone: 818-354-1067.

**URL:** <http://spaceplace.nasa.gov>

**Activities:** Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]

### **B75. Rossi X-ray Timing Explorer (RXTE)**

**Description:** The Rossi X-ray Timing Explorer (RXTE), launched in December 1995, continues to return a stream of impressive results on the physics of matter near sources of extreme gravity (neutron stars, black holes, and the supermassive black hole cores of active galaxies). The mission—a collaboration between NASA's Goddard Space Flight Center, MIT, and University of California, San Diego—centers on three flight instruments in a low-Earth orbit, that investigate the 2-250 keV X-ray spectral and milliseconds-to-years timing variability of astronomical sources. Since early in the mission, RXTE has supported an active E/PO program involving the RXTE Learning Center, an online educational resource for teachers and students. RXTE has also hosted teacher interns to design and develop lesson plans and classroom activities based on RXTE results. Recent accomplishments include the All Sky Monitor-based "Tour the X-ray Sky", which uses real data to introduce students to the types of variability seen in X-ray sources, and a series of supporting educator workshops to train teachers on the use of this module in their classroom. During the next 2 years, the RXTE E/PO program will focus on the classroom testing and educator dissemination of a collection of newly developed activities to go with a multimedia RXTE product—"The High Energy Groovie Movie." This movie mates an animation of the X-ray



variability of the entire sky over several years of the mission (developed by the All Sky Monitor team at MIT) with a high-energy original pop song, High Energy Groove (written and recorded by the Chromatics as part of the AstroCappella project), which describes the basics of modern X-ray astronomy. The activities, which were developed by two Maryland teacher interns in the summer of 2002, cover a range of topics, including the technology behind the PCA detectors, how accretion works in close binary systems, neutron stars and pulsars, active galaxies, and the electromagnetic spectrum.

Lead: Dr. Patricia Boyd, NASA Goddard Space Flight Center, Code 662, Greenbelt, MD 20771. E-mail: [padi@hea1.gsfc.nasa.gov](mailto:padi@hea1.gsfc.nasa.gov). Phone: 301-286-2550.

URL: [http://rxte.gsfc.nasa.gov/docs/xte/learning\\_center](http://rxte.gsfc.nasa.gov/docs/xte/learning_center)

Activities: Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]

#### **B76. Spectroscopy and Photometry of the IGMs Diffuse Radiation (SPIDR)**

Description: The Spectroscopy and Photometry of the Intergalactic Medium's Diffuse Radiation (SPIDR) mission, selected in July 2002 as one of two Small Explorer-class missions, was intended to answer fundamental questions about the creation and evolution of galaxies and other large stellar formations. Specifically, the spacecraft was designed to detect and determine the distribution of hot gases that permeate the universe. The SPIDR Mission was subsequently terminated. NASA has asked the team to resubmit the SPIDR proposal with further details with the new cycle of SMEX proposals. Further continuation of the E/PO might resume if SPIDR is selected in this new cycle.

Lead: Dr. Nahide Craig, University of California, Berkeley, MC 7450, Berkeley, CA 94720.  
E-mail: [ncraig@ssl.berkeley.edu](mailto:ncraig@ssl.berkeley.edu). Phone: 510-643-7273.

Contact: Dr. Bryan Mendez, University of California, Berkeley, MC 7450, Berkeley, CA 94720.  
E-mail: [bmendez@ssl.berkeley.edu](mailto:bmendez@ssl.berkeley.edu). Phone: 510-643-2178.

Activities: "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A9]  
SEU Forum: Mission Support [A417]  
SPIDR Teacher Professional Development Workshops [A199]

#### **B77. Submillimeter Wave Astronomy Satellite (SWAS)**

Description: SWAS is part of the Small Explorer program. SWAS studies the chemical composition, energy balance and structure of interstellar clouds and the processes that lead to the formation of stars and planets. (Launched December 5, 1998)

Activities: Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]

#### **B78. Swift Gamma Ray Burst Mission**

Description: The Swift Gamma Ray Burst Explorer is a NASA medium-sized explorer (MIDEX) mission being developed by an international collaboration for launch in 2004. Swift is the first of its kind: a multi-wavelength observatory dedicated to the study of gamma-ray bursts. The main mission objectives of Swift include: determining the origin of gamma-ray bursts, classifying gamma-ray bursts as well as searching for new types, determining how the blast wave evolves and interacts with the surroundings, the use of gamma-ray bursts to study the early universe, and performing a sensitive survey of the sky in the hard x-ray band. Swift has a complement of three coaligned instruments that study bursts in the gamma-ray, x-ray, ultraviolet and optical bands. Using prompt burst location information, Swift can slew quickly to point its on-board x-ray and UV/optical instrumentation at the burst for continued afterglow studies. The goal of the Swift mission E/PO at Sonoma State University is to use the observations and scientific discoveries of the Swift mission to improve the understanding and utilization of science and mathematics concepts for grades 7–12. The program, which includes posters accompanied by educator guides, has developed "Invisible Universe: From Radio Waves to Gamma-Rays," in partnership with the GEMS group at the Lawrence Hall of Science. "What's In The News?" a television show, produced by Penn State, informs middle-school students across the country about Swift in several different segments that are produced each year. Penn State also offers yearly workshops for science educators that feature Swift and other space-based telescopes. Evaluation and guidance of the development of educational materials comes from the Swift Education Committee (SwEC) and four Swift Educator Ambassadors, who also help to disseminate Swift's educational materials.

Lead: Dr. Lynn Cominsky, Sonoma State University, Department of Physics and Astronomy, 1801 East Cotati Avenue, Rohnert Park, CA 94928. E-mail: [lynnc@charmian.sonoma.edu](mailto:lynnc@charmian.sonoma.edu). Phone: 707-664-2655.

URL: <http://swift.gsfc.nasa.gov>

Activities: "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A9]  
"Invisible Universe": Educator Workshops [A169]



SEU Forum: Mission Support [A417]  
 Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]  
 Swift Gamma Ray Burst Mission: High-Energy Student Presentations [A322]  
 Swift Gamma Ray Burst Mission: Public Presentations [A451]  
 Swift Television: "What's in the News?" [A323]  
 The Electromagnetic Spectrum Poster [A128]  
 XMM-Newton High-Energy Classroom Teacher Workshops [A218]

### **B79. Wilkinson Microwave Anisotropy Probe (WMAP)**

**Description:** WMAP continues to concentrate its E/PO efforts in electronic forms. WMAP's mission page and "Teacher's Guide to the Universe" Web site explain both the basics about cosmology as well as mission details. Additionally, WMAP has supported the SEU Forum's creation of the "Cosmic Questions" exhibit and Space Science Update Kiosk. WMAP has created four postcards for public and educational outreach and has helped to create a mission card for the Cosmic Journeys Card game. WMAP has been represented at national and state conferences by education staff, and it has contributed to SEU Forum Kits. The WMAP E/PO coordinator has led a course for an informal audience at a local planetarium. WMAP continues to work with the Cooperative Satellite Learning Program and Old Bridge High School.

**Lead:** Dr. David Spergel, Princeton University, Peyton Hall, Dept. of Astrophysics, Princeton, NJ 08544-1001.  
 E-mail: [dns@astro.princeton.edu](mailto:dns@astro.princeton.edu). Phone: 609-258-3589.

**Contact:** Ms. Lindsay Bartolone, Adler Planetarium and Astronomy Museum, Education, 1300 S. Lake Shore Drive, Chicago, IL 60605. E-mail: [clark@astro.princeton.edu](mailto:clark@astro.princeton.edu). Phone: 312-322-0316.

**URL:** <http://map.gsfc.nasa.gov>

**Activities:** "A Teacher's Guide to the Universe": MAP Workshop [A143]  
 "Cosmic Journeys" Collectible Card Game: Educator Workshop [A150]  
 "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A9]  
 SEU Forum: Mission Support [A417]  
 Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]  
 WMAP Cooperative Satellite Learning Project (CSLP) [A329]  
 WMAP Informal Outreach: MAPping the Cosmic Microwave Background [A464]  
 York College Observatory Educational Outreach Program (YCOOP) [A58]

## **Attached Payloads**

### **B80. Advanced Cosmic-Ray Composition Experiment for the Space Station (ACCESS)**

**Description:** ACCESS is being developed for a possible launch in 2007. This experiment will make spectral, individual element composition measurements at energies reaching up to  $10^{15}$  electronvolts, in order to address fundamental questions concerning the origin and acceleration of the cosmic radiation.

**Activities:** Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]

## **Other NASA Programs**

### **B81. High Energy Astrophysics Science Archive Research Center (HEASARC)**

**Description:** Since 1996, the HEASARC E/PO program has been bringing information and curriculum support materials to upper middle school, high school, and lower undergraduate students and their teachers on topics relating to the structure and evolution of the universe, with an emphasis on high-energy astronomy. The E/PO program consists of the "Imagine the Universe!" Web site, a series of poster and information/activity booklets, and a repertoire of educator workshops. Both scientists and educators are involved in the development and testing of the materials, which use satellite data to teach topics in science and math. HEASARC also hosts the StarChild Web site and annually publishes a CD-ROM containing "Imagine", "StarChild", and the "Astronomy Picture of the Day". Materials are distributed to thousands of educators via workshops, meetings, and email requests. The HEASARC also coordinates with the E/PO programs of other SEU high-energy astrophysics missions such as RXTE, GLAST, Swift, and XMM.

**Lead:** Dr. James Lochner, NASA Goddard Space Flight Center, Code 662, Greenbelt, MD 20771.  
 E-mail: [lochner@xeric.gsfc.nasa.gov](mailto:lochner@xeric.gsfc.nasa.gov). Phone: 301-286-9711.

**URL:** <http://heasarc.gsfc.nasa.gov>

**Activities:** "Black Holes in a Different Light": Educator Workshop [A146]  
 "Cosmic Journeys" Collectible Card Game: Educator Workshop [A150]

"Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A9]  
 "Elements 2002": Follow-Up Educator Workshop [A156]  
 "Hidden Lives of Galaxies": Educator Workshop [A164]  
 "Life Cycles of Stars": Workshop [A170]  
 Overview of StarChild Web Site [A187]  
 Scientist Shadowing [A193]  
 SEU Forum: Mission Support [A417]  
 "What is Your Cosmic Connection to the Elements?" [A135]  
 "What is Your Cosmic Connection to the Elements?": Educator Workshop [A217]  
 "What is Your Cosmic Connection to the Elements?": Student Presentation [A328]

## International Missions with NASA Participation

### B82. Cosmic Background Explorer (COBE)

**Description:** The COBE satellite was developed to measure the diffuse infrared and microwave radiation from the early Universe, to the limits set by our astrophysical environment. It was launched in November 1989 and carried three instruments: a Far Infrared Absolute Spectrophotometer (FIRAS) to compare the spectrum of the cosmic microwave background radiation with a precise black body, a Differential Microwave Radiometer (DMR) to map the cosmic radiation precisely, and a Diffuse Infrared Background Experiment (DIRBE) to search for the cosmic infrared background radiation. The cosmic microwave background spectrum was measured with a precision of 0.005 percent; the results confirmed the Big Bang theory of the origin of the Universe.

**URL:** <http://nssdc.gsfc.nasa.gov/database/MasterCatalog?sc=1989-089A>

**Activities:** "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A9]  
 "Passport to the Solar System" (PTSS) [A232]  
 "Science Concepts in Context" [A2335]

### B83. High Energy Transient Explorer 2 (HETE-2)

**Description:** HETE-2's prime objective is to carry out a multi-wavelength study of gamma-ray bursts (GRBs) with Ultraviolet, x-ray, and gamma-ray instruments. A unique feature of the mission is its capability to localize bursts with several-arcsecond accuracy in near real-time aboard the spacecraft. The original HETE spacecraft was lost as a result of a launch failure in November 1996. (HETE-2 was launched in October 2000.)

**Lead:** Dr. Irene Porro, Massachusetts Institute of Technology, NE80-6095, 77 Massachusetts Avenue, Cambridge, MA 02139. E-mail: [iporro@space.mit.edu](mailto:iporro@space.mit.edu). Phone: 617-258-7481.

**URL:** <http://space.mit.edu/HETE>

**Activities:** "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A9]  
 SEU Forum: Mission Support [A417]  
 Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]

### B84. Astro-E2

**Description:** Astro-E2 is a joint U.S.-Japanese mission to explore the x-ray universe at high spectral resolution. The mission uses a microcalorimeter which determines x-ray energies from cosmic sources by measuring the heat deposited by the x-rays into an absorbing material. To accomplish this, the detector is cooled to 60 milli-Kelvin using an adiabatic de-magnetization refrigerator. The mission also includes lightweight mirrors to focus the x-rays onto the detectors. Astro-E2 will probe the chemical composition of supernova remnants and galaxy clusters, and measure the motion of material before it falls into a black hole. The E/PO program for the mission seeks to bring students into the science and technology of the mission. Working with the NASA Student Involvement Program, Astro-E2 will sponsor a competition for students to share in the data from the mission. This effort will be supported by the Astro-E2 Guest Observer Facility at NASA's Goddard Space Flight Center. We will also produce a video which tells the story of the science, technology, and history of the mission for teachers to use in their science, math, or social studies classes. The video will particularly touch on the cross-cultural aspects of working with the Japanese. These efforts will be supported by a Web site, which will provide background material and lessons on the use of spectroscopy in x-ray astronomy.

**Lead:** Dr. James Lochner, NASA Goddard Space Flight Center, Code 662, Greenbelt, MD 20771.

E-mail: [lochner@xeric.gsfc.nasa.gov](mailto:lochner@xeric.gsfc.nasa.gov). Phone: 301-286-9711.

**URL:** [http://astroe.gsfc.nasa.gov/docs/astroe\\_lc](http://astroe.gsfc.nasa.gov/docs/astroe_lc)

**Activities:** Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]

**B85. International Gamma-Ray Astrophysics Laboratory (INTEGRAL)**

**Description:** INTEGRAL is an international gamma ray mission led by the European Space Agency with NASA participation. The Laboratory for High-Energy Astrophysics at NASA Goddard Space Flight Center provides science support services for the U.S. astronomers participating in the mission. INTEGRAL's key science question is to probe the origin of the elements by studying gamma ray emission lines from the galactic center, supernovae, black holes, and the sun. The E/PO program features the development of a poster and activity booklet on the topic of the origin of the elements. Development of these materials includes a week-long educator workshop which provides content for the participants and development of classroom activities by the participants. The E/PO program also includes the development of a Gamma-ray comic book, which will explain gamma-ray astronomy and various techniques used to detect cosmic gamma rays.

**Lead:** Dr. James Lochner, NASA Goddard Space Flight Center, Code 662, Greenbelt, MD 20771.

E-mail: [lochner@xeric.gsfc.nasa.gov](mailto:lochner@xeric.gsfc.nasa.gov). Phone: 301-286-9711.

**URL:** <http://obswww.unige.ch/isdc/Outreach>

**Activities:** "Elements 2002": Follow-Up Educator Workshop [A156]

Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]

"What is Your Cosmic Connection to the Elements?" [A135]

**B86. X-ray Multi-Mirror Mission (XMM-Newton)**

**Description:** XMM-Newton is a European Space Agency x-ray spectroscopy observatory launched in December 1999. Beginning in 2003, NASA participation in the XMM-Newton E/PO program has been led by the group at Sonoma State University. The program is developing curriculum materials for grades 6-12, a computer-based x-ray spectroscopy simulation laboratory exercise in partnership with Project CLEA (Contemporary Laboratory Experiences in Astronomy), and a Starlab planetarium program showcasing the X-ray sky.

**Lead:** Dr. Lynn Cominsky, Sonoma State University, Department of Physics and Astronomy, 1801 East Cotati Avenue, Rohnert Park, CA 94928. E-mail: [lynnc@charmian.sonoma.edu](mailto:lynnc@charmian.sonoma.edu). Phone: 707-664-2655.

**URL:** <http://xmm.sonoma.edu>

**Activities:** "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A9]

"Science Concepts in Context" [A235]

SEU Forum: Mission Support [A417]

Structure and Evolution of the Universe (SEU) Educator Ambassadors [A204]

XMM-Newton High-Energy Classroom Teacher Workshops [A218]

**SUN-EARTH CONNECTION MISSIONS****Major Missions****B87. Interstellar Probe (IS)**

**Description:** The Interstellar Probe is a mission in the very early concept definition phase that is designed to cross the solar wind termination shock and heliopause and make a significant penetration into the local interstellar medium, characterizing the regions it passes. This mission offers a significant technological challenge in that its success will require the achievement of spacecraft velocities of 10 astronomical units (10 times the Earth-Sun distance) per year.

**URL:** <http://interstellar.jpl.nasa.gov>

**Activities:** "Space Weather Center" Traveling Exhibit [A19]

**B88. Solar Probe (SP)**

**Description:** Solar Probe (SP) will be the first visit to our star to explore the complex and time-varying interplay of the Sun and Earth which affects human activity. SP will determine where and what physical processes heat the corona and accelerate the solar wind to its super-sonic velocity. A combined remote sensing and in-situ sampling from within the solar corona itself will provide a "ground" never before available from astronomical measurements made from spacecraft in the Earth's orbit or LaGrange points. Solar Probe is currently being developed as part of the Sun-Earth Connection theme within the NASA Office of Space Science.

**URL:** <http://solarprobe.gsfc.nasa.gov>

**Activities:** "Space Weather Center" Traveling Exhibit [A19]

**B89. Ulysses**

**Description:** Ulysses makes passes over the north and south poles of the Sun in order to forecast solar weather. The spacecraft was the first to explore interplanetary science at high solar latitudes. Launched in October 1990, it has provided scientific data for the last 12 years. Students from Los Angeles County compete for interview opportunities with team members on space science, spacecraft design, spacecraft operations, and project management. Students' interests are matched with team-member volunteers. Students conduct research and professional interviews and make a professional presentation at the end of the project. A team member attends and evaluates all presentations.

**URL:** <http://www.ulysses.jpl.nasa.gov/index.html>

**Activities:** Girl Scouts of the USA/NASA Collaboration [A65]  
 "Live from the Aurora" and "Auroras: Living With a Star" [A274]  
 "Passport to the Solar System" (PTSS) [A232]  
 "Science Concepts in Context" [A235]  
 Solar System Community Events Program [A423]  
 Sun-Earth Connections Educator Kit [A125]

**B90. Voyager**

**Description:** The Voyager mission continues its quest to expand the boundaries of space exploration. Voyager 1, now the most distant human-made object in the Universe, and Voyager 2, close on its heels, continue their ground-breaking journeys with their current mission to study the region in space where the Sun's influence ends and the dark recesses of interstellar space begin. E/PO goals include: (1) continuing to improve the quality and quantity of project participation in outreach programs; (2) interacting with Deep Space Network Outreach, the Jet Propulsion Laboratory (JPL) education office, the Sun-Earth Connection (SEC) community, and the project's investigators to assist in the development of classroom tools; (3) increasing the level of Voyager public awareness with the help of the JPL media relations office; (4) continuing collaborations with the Stanford Solar Center and the SEC Broker/Facilitators; (5) participating in SEC Forum Sun-Earth Day teacher training and the live Webcast; (6) attending the National Science Teachers Association meeting as a partner with the SEC Forum.

**Lead:** Dr. Andrea Angrum, NASA Jet Propulsion Laboratory, 264-801, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [andrea.angrum@jpl.nasa.gov](mailto:andrea.angrum@jpl.nasa.gov). Phone: 818-354-6775.

**URL:** <http://voyager.jpl.nasa.gov>

**Activities:** Girl Scouts of the USA/NASA Collaboration [A65]  
 "Live from the Aurora" and "Auroras: Living With a Star" [A274]  
 "Passport to the Solar System" (PTSS) [A232]  
 "Science Concepts in Context" [A235]  
 Solar System Community Events Program [A423]  
 Sun-Earth Connections Educator Kit [A125]  
 Sun-Earth Day [A449]  
 Voyager Classroom Visits [A327]  
 Voyager Conferences [A461]  
 Voyager Speakers Bureau [A462]

## Solar-Terrestrial Probes

**B91. Solar-Terrestrial Probes Program Office (STP)**

**Description:** The STP program is a comprehensive effort to observe and understand our star and its effect on our environment. The E/PO effort focuses on sharing those discoveries in the formal and informal education communities through mentoring, exhibits, and workshops.

**Lead:** Ms. Barbara Lambert, NASA Goddard Space Flight Center, Code 460, Greenbelt, MD 20771.  
 E-mail: [blambert@hst.nasa.gov](mailto:blambert@hst.nasa.gov). Phone: 301-286-1275.

**URL:** <http://stp.gsfc.nasa.gov>

**Activities:** "Live from the Aurora" and "Auroras: Living With a Star" [A274]  
 "Science Concepts in Context" [A235]  
 Solar Terrestrial Probes Planetarium, Science Centers and Museum Outreach [A424]  
 Solar Terrestrial Probes: Classroom and Public Engagements [A425]  
 "Space Weather Center" Traveling Exhibit [A19]

**B92. Geospace Electrodynamic Connections (GEC)**

**Description:** The Geospace Program will consist of two primary flight investigations, a Radiation Belt Baseline Investigation and an Ionosphere-Thermosphere (I-T) Investigation. The Baseline Radiation Belt Investigation comprises three components: (1) in situ measurement from two spacecraft of radiation belt particles and fields and of ring current H<sup>+</sup> and O<sup>+</sup> in a highly elliptical orbit; (2) measurement of precipitating particles from low Earth orbit; and (3) global energetic neutral atom imaging of the ring current. The Baseline I-T Investigation will consist of two key elements: (1) in situ (and limited remote sensing) measurements in the I-T system and (2) imaging of the global low- and mid-latitude I-T system from a high-altitude platform. An integral element of the Geospace Program is the development of models that will incorporate the improved physical understanding of these two regions to provide improved real-time specification of the space environment (nowcasting) and prediction of potentially hazardous space weather conditions (forecasting).

**URL:** <http://lws.gsfc.nasa.gov/geospace.htm>

**Activities:** "In a Different Light" [A112]

**B95. Solar-B**

**Description:** The Solar-B satellite observatory will be launched into a polar orbit around the Earth to allow almost uninterrupted observations of our Sun. Three major instruments will make coordinated observations at multiple wavelengths, examining processes taking place on the Sun's surface and in its atmospheric envelope. Solar-B E/PO is primarily developed and implemented at the new Chabot Space and Science Center in Oakland, CA in collaboration with the Lockheed-Martin Solar and Astrophysics Lab. Forms of E/PO include exhibits, teacher training workshops, video/multimedia productions, posters and brochures, an adult solar astronomy class, "solar" summer camps for children, and a high school solar astronomy internship program.

**Lead:** Mr. Benjamin Burress, Chabot Space and Science Center, 10902 Skyline Blvd, Oakland, CA 94619. E-mail: [bburress@chabotspace.org](mailto:bburress@chabotspace.org). Phone: 510-336-7308.

**URL:** <http://www.chabotspace.org/vsc/exhibits/solarb/default.asp>

**Activities:** "By the Light of the Sun" [A1]  
"Fun in the Sun" Summer Camp [A363]  
Sun-Earth Day [A449]  
"Sunspotting: Tracking the Wild Sunspot" [A450]  
"Touch the Sun": Teacher Workshop [A213]

**B96. Solar-Terrestrial Relations Observatory (STEREO)**

**Description:** STEREO is the third of five Solar Terrestrial Probes. This mission will obtain simultaneous images of the Sun from two spacecraft and build a 3-D picture of coronal mass ejections (CMEs) and the complex structures around them. STEREO will also study the propagation of disturbances through the heliosphere and their effects at Earth orbit. The STEREO E/PO program participates in the Sun-Earth Connection Education Forum-sponsored workshops that meet the needs of educators at all grade levels. We present these workshops to inservice educators to teach them about the most recent and relevant solar and STEREO science discoveries, which they will then teach in their classrooms. Mission scientists participate in the workshops to share the science content. Education specialists provide integrated, hands-on activities to demonstrate science application in the classroom. The missions also provide images and animations to support programs that have been developed by the science centers specifically for educators and for the general public.

**Lead:** Dr. Nahide Craig, University of California, Berkeley, MC 7450, Berkeley, CA 94720. E-mail: [ncraig@ssl.berkeley.edu](mailto:ncraig@ssl.berkeley.edu). Phone: 510-643-7273.

**URL:** <http://stp.gsfc.nasa.gov/missions/stereo/stereo.htm>

**Activities:** "Live from the Aurora" and "Auroras: Living With a Star" [A274]  
New Horizons Public Outreach [A404]  
New Horizons Student Support [A298]  
RHESSI Teacher Professional Development [A191]  
SEC Forum: Formal Education Student Support [A309]  
SEC Forum: Informal and Public Outreach [A415]  
STEREO/IMPACT: Classroom Visits and Student Support [A318]



Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A206]  
TIMED Student Support [A324]

### **B97. Thermosphere Ionosphere Mesosphere Energetics and Dynamics (TIMED)**

- Description:** The TIMED mission is currently studying the influences of the Sun and human activity on the least explored and understood region of Earth's atmosphere: the Mesosphere and Lower Thermosphere/Ionosphere (MLTI). The MLTI region is the gateway between Earth's environment and space, where the Sun's energy is first deposited into Earth's environment. TIMED focuses on the portion of this region located approximately 60-180 kilometers above the surface. From studying portions of Earth's atmosphere, scientists believe global change is occurring, primarily due to variations in the Sun's cycle and the human-induced release of gases such as methane and carbon dioxide into the atmosphere. The TIMED E/PO Web site offers activities, a Teacher's Corner, and TIMED lesson plans.
- Lead:** Ms. Kerri Beisser, Johns Hopkins Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099. E-mail: [kerri.beisser@jhuapl.edu](mailto:kerri.beisser@jhuapl.edu). Phone: 443-778-6050.
- Contact:** Ms. Linda Butler, Johns Hopkins Applied Physics Laboratory, Space Dept/E&PO Office, 11100 Johns Hopkins Road, Laurel, MD 20723-6099. E-mail: [Linda.Butler@jhuapl.edu](mailto:Linda.Butler@jhuapl.edu). Phone: 240-228-5746.
- URL:** <http://www.timed.jhuapl.edu>
- Activities:** "Live from the Aurora" and "Auroras: Living With a Star" [A274]  
New Horizons Public Outreach [A404]  
New Horizons Student Support [A298]  
"Passport to the Solar System" (PTSS) [A232]  
"Science Concepts in Context" [A235]  
Student Observation Network (SON) [A319]  
Sun-Earth Day [A449]  
TIMED Public Outreach [A454]  
TIMED Student Support [A324]

## **Explorers**

### **B98. Advanced Composition Explorer (ACE)**

- Description:** The primary purpose of the ACE is to determine and compare the isotopic and elemental composition of several distinct samples of matter, including the solar corona, the interplanetary medium, the local interstellar medium, and galactic matter. For education and public outreach, ACE shares the following topics through a Web site, printed materials, workshops, and presentations: the composition of the Solar System and extrasolar bodies, particle composition from solar wind to galactic cosmic rays, the causes and effects of transient events, solar and galactic evolution, and stellar nucleosynthesis.
- Lead:** Ms. Beth Jacob, NASA Goddard Space Flight Center, Code 661, Greenbelt, MD 20771.  
E-mail: [beth@milkyway.gsfc.nasa.gov](mailto:beth@milkyway.gsfc.nasa.gov). Phone: 301-286-7209.
- URL:** <http://www.srl.caltech.edu/ACE/ASC>
- Activities:** ACE Public Outreach Talks [A332]  
Career Day at Lowell Bayside Academy [A245]  
Career Opportunities in Space Engineering and Space Science [A246]  
"Live from the Aurora" and "Auroras: Living With a Star" [A274]  
Mars Close-Up Showing [A379]  
NASA Connect: Having a Solar Blast [A293]  
"Passport to the Solar System" (PTSS) [A232]  
Science and Mathematics Achievement Through Research Training (Project SMART) [A306]  
"Science Concepts in Context" [A235]  
"Space Weather Center" Traveling Exhibit [A19]  
Student Observation Network (SON) [A319]  
Sun-Earth Day [A449]  
University of New Hampshire: Public Television Interview [A460]

### **B99. Fast Auroral Snapshot Explorer (FAST)**

- Description:** The FAST Explorer was launched into orbit in August 1996. The instruments aboard FAST measure charged particles which enter Earth's upper atmosphere. Large waves of these particles from the Sun begin to glow

once inside Earth's atmosphere, causing a spectacular light show known as the aurora borealis or northern lights. The education and public outreach for FAST includes K–12 curriculum components such as lessons, activities, and information that will help teachers and students understand the aurora, the sounding rockets, and the satellites that study them.

Lead: Dr. Nahide Craig, University of California, Berkeley, MC 7450, Berkeley, CA 94720.

E-mail: [ncraig@ssl.berkeley.edu](mailto:ncraig@ssl.berkeley.edu). Phone: 510-643-7273.

Contact: Dr. Laura Peticolas, University of California, Berkeley, 7504, Berkeley, CA 94720.

E-mail: [laura@ssl.berkeley.edu](mailto:laura@ssl.berkeley.edu). Phone: 510-643-7273.

URL: [http://cse.ssl.berkeley.edu/fast\\_epo](http://cse.ssl.berkeley.edu/fast_epo)

Activities: CHIPS Classroom Visits and Student Support [A250]

FAST Classroom Visits and Student Support [A257]

“Live from the Aurora” and “Auroras: Living With a Star” [A274]

RHESSI Teacher Professional Development [A191]

RHESSI: Public Outreach and Informal Education [A411]

Science and Mathematics Achievement Through Research Training (Project SMART) [A306]

SEC Forum: Formal Education Student Support [A309]

SEC Forum: Informal and Public Outreach [A415]

Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A206]

### **B100. Imager for Magnetopause-to-Aurora Global Exploration (IMAGE)**

Description: The IMAGE satellite is the first spacecraft dedicated to imaging Earth's magnetosphere, a region of space that is controlled by Earth's magnetic field and contains extremely tenuous plasmas of both solar and terrestrial origin. IMAGE employs a variety of imaging techniques to see the invisible and produce the first comprehensive global images of plasma in the inner magnetosphere. The IMAGE education and public outreach program is called Public Outreach, Education, Teaching and Reaching Youth (POETRY). We specialize in developing classroom activities, CD-ROMs, and other products that help students understand Earth's magnetic field, its radiation belts, and the impact of solar activity on our technology. The goal of POETRY is to rewrite textbooks to explain the causes of auroras, update K–12 descriptions of Earth's magnetic field and its systems of particles, and to provide teachers with the latest information about the effects of space weather. We also conduct an award-winning “Ask the Space Scientist” Web-based forum, where students may ask questions about space science.

URL: <http://image.gsfc.nasa.gov/poetry>

Activities: IMAGE Classroom Activities Archive [A110]

IMAGE Internet Activities [A111]

IMAGE Presentations to Students [A270]

IMAGE: Amateur Astronomy Clubs [A373]

IMAGE: Educational Radio Program [A374]

IMAGE: Planetarium and Museum Lectures [A375]

“Live from the Aurora” and “Auroras: Living With a Star” [A274]

NASA Connect: Having a Solar Blast [A293]

NASA/CONNECT [A401]

National Society of Black Physicists Annual Convention [A72]

“Passport to the Solar System” (PTSS) [A232]

“Science Concepts in Context” [A235]

Soda Bottle Magnetometer [A122]

“Space Weather Center” Traveling Exhibit [A19]

Student Observation Network (SON) [A319]

Sun-Earth Day [A449]

Sun-Earth Day Workshop [A476]

### **B101. Interplanetary Monitoring Platform (IMP-8)**

Description: IMP-8 (also known as IMP-J) was launched by NASA in 1973 to measure the magnetic fields, plasmas, and energetic charged particles (e.g., cosmic rays) of Earth's magnetotail and magnetosheath and the near-Earth solar wind. IMP-8, the last of 10 IMP (Interplanetary Monitoring Platform) spacecraft launched in 10 years, continues to accumulate data that is useful in understanding long-term solar processes. IMP-8 scientists at NASA Goddard Space Flight Center provide their expertise through the validation of educational products

whose content deals with interplanetary and magnetotail studies of cosmic rays, energetic solar particles, plasma, and electric and magnetic fields.

Lead: Dr. Joseph King, NASA Goddard Space Flight Center, Code 633, Greenbelt, MD 20771. E-mail:

*Joseph.H.King.1@gsfc.nasa.gov*. Phone: 301-286-7355.

URL: <http://nssdc.gsfc.nasa.gov/nmc/tmp/1973-078A.html>

Activities: "Live from the Aurora" and "Auroras: Living With a Star" [A274]  
"Science Concepts in Context" [A235]

### **B102. Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI)**

Description: RHESSI is funded by NASA's Explorers Program under the category of small explorers. RHESSI may help to answer one of the most fundamental questions about how the Sun works: How do solar flares release such large quantities of energy in such a short span of time? (A single flare can be as powerful as 10 million volcanic explosions!) The centerpiece of the RHESSI mission is the imager, which uses a new technology to capture images and spectra of high-energy solar flares. RHESSI's primary E/PO goal is to provide high-quality education and outreach experiences for precollege teachers, students, and the general public. Additionally, through our university/NASA Center collaboration, RHESSI will be able to provide research opportunities to enhance the education of undergraduate and graduate students. Thus, the RHESSI E/PO effort will permeate all facets of the mission, allowing the college-level students to serve as effective liaisons to the precollege community that we plan to involve. The University of California, Berkeley's E/PO efforts will focus on middle and high school teachers, their students, and the public. In the formal arena, we will concentrate on the middle school grades 6–8, since here is where RHESSI-related content is taught in the precollege science curriculum and where students typically stop being interested in science. We will also conduct regular public awareness activities, highlighting RHESSI data in collaboration with the Exploratorium. The Exploratorium's "Live@the Exploratorium" Internet netcast series will be able to highlight RHESSI during the years of high solar activity through regularly scheduled public events. To complement these high-visibility Internet netcasts for the public, we will develop self-guided Internet modules that highlight key aspects of the RHESSI mission and its data.

Lead: Dr. Nahide Craig, University of California, Berkeley, MC 7450, Berkeley, CA 94720.

E-mail: *ncraig@ssl.berkeley.edu*. Phone: 510-643-7273.

Contact: Dr. Bryan Mendez, University of California, Berkeley, MC 7450, Berkeley, CA 94720.

E-mail: *bmendez@ssl.berkeley.edu*. Phone: 510-643-2178.

URL: <http://cse.ssl.berkeley.edu/hessi>

Activities: Cosmic Hot Interstellar Plasma Spectrometer (CHIPS) Curriculum Dissemination [A95]

"Discover the Solar Cycle" [A96]

"Live from the Aurora" and "Auroras: Living With a Star" [A274]

NASA Connect: Having a Solar Blast [A293]

National Society of Black Physicists Annual Convention [A72]

RHESSI Teacher Professional Development [A191]

RHESSI: Classroom Visits and Student Support [A305]

RHESSI: Curriculum Dissemination [A234]

RHESSI: Public Outreach and Informal Education [A411]

"Science Concepts in Context" [A235]

SEC Forum: Informal and Public Outreach [A415]

"Space Weather Center" Traveling Exhibit [A419]

SPIDR Teacher Professional Development Workshops [A199]

Student Observation Network (SON) [A319]

Students United with NASA Becoming Enthusiastic About Math and Science (SUNBEAMS) [A78]

Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A206]

Sun-Earth Connections Educator Kit [A125]

Sun-Earth Day [A449]

Sun-Earth Day Workshop [A476]

### **B103. Solar Anomalous and Magnetospheric Particle Explorer (SAMPEX)**

Description: SAMPEX is designed to detect solar energy particles, precipitating energetic electrons, anomalous cosmic rays, and galactic cosmic rays throughout a solar cycle. E/PO consists of SAMPEX scientists and engineers at NASA's Goddard Space Flight Center who support a high school team in the Cooperative Satellite Learning

Program (CSLP). The CSLP is a unique education partnership among various high schools, Allied Signal Technical Services Corporation in Seabrook, MD, and Goddard that involves high school students in the process of developing and operating SAMPEX. This pilot program provides students with an understanding of the overall end-to-end system that is used to support SAMPEX, and it will demonstrate how NASA implements a specific mission for a given scientific endeavor. It also introduces the students to careers in space. A mission monitoring system in the high school receives and processes SAMPEX satellite data and provides computer-assisted tutoring. In this way, students participate directly in SAMPEX tests, simulations, and orbital operations.

Lead: Mr. Jim Watzin, NASA Goddard Space Flight Center, Code 474, Greenbelt, MD 20771.

E-mail: [jim.watzin@gsfc.nasa.gov](mailto:jim.watzin@gsfc.nasa.gov). Phone: 301-286-7933.

URL: <http://sunland.gsfc.nasa.gov/smex/sampek/index.html>

Activities: "Live from the Aurora" and "Auroras: Living With a Star" [A274]

### **B105. Time History of Events and Macroscale Interactions During Substorms (THEMIS)**

Description: The Time History of Events and Macroscale Interactions during Substorms (THEMIS) is to be launched in 2007. THEMIS is a five-satellite mission with the job of determining the causes of the global reconfigurations of the Earth's magnetosphere that are evidenced in auroral activity. THEMIS consists of five small satellites, carrying identical suites of electric, magnetic, and particle detectors, that will be put in carefully coordinated orbits. Every four days the satellites will line up along the Earth's magnetic tail, allowing them to track disturbances. The satellite data will be combined with observations of the aurora from a network of observatories across the Arctic Circle. As part of the E/PO program for the THEMIS mission, new ground magnetometer stations will be established at secondary schools, tribal and community colleges in eight states. The Space Grant Consortia of the eight states (Alaska, Oregon, Montana, North Dakota, South Dakota, Wisconsin, Michigan, Pennsylvania) will work with the mission and the state schools to identify the location for the magnetometer stations, and will coordinate local educational and outreach effects of the new facility, its data, and the THEMIS mission, extending the impact of the magnetometer station beyond the single school at which it is located. The competition for selection of school sites will be in the fall of 2003.

Lead: Dr. Nahide Craig, University of California, Berkeley, MC 7450, Berkeley, CA 94720.

E-mail: [ncraig@ssl.berkeley.edu](mailto:ncraig@ssl.berkeley.edu). Phone: 510-643-7273.

URL: <http://sprg.ssl.berkeley.edu/themis>

Activities: THEMIS: Teacher Professional Development [A212]

### **B106. Transition Region and Coronal Explorer (TRACE)**

Description: A mission of the Small Explorer program, TRACE observes the effects of the emergence of magnetic flux from deep inside the Sun to the outer corona with high spatial and temporal resolution. (TRACE was launched in April 1998.)

Lead: Ms. Dawn Myers, NASA Goddard Space Flight Center, Code 682.4, Greenbelt, MD 20771.

E-mail: [dcm@chippewa.nascom.nasa.gov](mailto:dcm@chippewa.nascom.nasa.gov). Phone: 301-286-5283.

URL: <http://nis-www.lanl.gov/nis-projects/twins>

Activities: "Live from the Aurora" and "Auroras: Living With a Star" [A274]

"Passport to the Solar System" (PTSS) [A232]

"Science Concepts in Context" [A235]

Student Observation Network (SON) [A319]

TRACE: Image Distribution to the Public [A457]

## **International Solar-Terrestrial Physics**

### **B108. Cluster II**

Description: Cluster is a European Space Agency program with major NASA involvement. The four Cluster spacecraft carry out 3-D measurements in Earth's magnetosphere, covering both large- and small-scale phenomena in the sunward and tail regions. The first two spacecraft were launched in July 2000; the second pair were launched in August 2000.

URL: <http://sci.esa.int/home/clusterii/index.cfm>

Activities: "Live from the Aurora" and "Auroras: Living With a Star" [A274]

Science and Mathematics Achievement Through Research Training (Project SMART) [A306]

"Science Concepts in Context" [A235]

Sounds of Space-Science and Art [A428]

**B109. Geotail**

**Description:** The Geotail mission is a collaborative project undertaken by the Japanese Institute of Space and Astronautical Science (ISAS) and NASA. Its primary objective is to study the tail of Earth's magnetosphere. The information gathered is allowing scientists to model and more accurately predict Sun-Earth interactions and their effects on space exploration, communications, and technology systems. (Geotail was launched in July 1992.)

**URL:** <http://www-spf.gsfc.nasa.gov/istp/geotail>

**Activities:** "Live from the Aurora" and "Auroras: Living With a Star" [A274]  
"Science Concepts in Context" [A235]

**B110. Polar**

**Description:** The Solar Terrestrial Science Program (STSP) composed of SOHO and Cluster, with Geotail (ISAS-Japan), Wind, and Polar, cooperates in E/PO by providing educational products, science data, and images that tell the story of the Sun. These materials (images) can be seen in most museums, planetariums, and science centers, and they support STSP's work with the general public. Images are also shown by national television broadcasting companies to share a solar event with the public when it happens.

**Lead:** Dr. Nicola Fox, Johns Hopkins Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099. E-mail: [foxnj1@jhuapl.edu](mailto:foxnj1@jhuapl.edu).

**URL:** <http://www-spf.gsfc.nasa.gov/istp/polar>

**Activities:** "Life as a Space Scientist" [A273]  
"Live from the Aurora" and "Auroras: Living With a Star" [A274]  
"Passport to the Solar System" (PTSS) [A232]  
Science and Mathematics Achievement Through Research Training (Project SMART) [A306]  
"Science Concepts in Context" [A235]  
Songs of the Aurora and Solar Wind at Family Adventures in Science [A427]  
"Sounds of Plasma Waves in Space" [A312]  
"Space Physics Research at the University of Iowa" [A313]  
Student Observation Network (SON) [A319]  
Sun Rings [A446]  
Sun Rings: A Pre-Performance Presentation [A447]  
Sun-Earth Connection (SEC) Classroom Visits [A321]  
Sun-Earth Day [A449]  
Tour of University of Iowa Department of Physics and Astronomy [A325]  
University of Iowa Experimental Space Research Projects Talk [A459]  
"University of Iowa Space Research: Past, Present, and Future" [A326]

**B111. Wind**

**Description:** The Solar Terrestrial Science Program (STSP) — composed of SOHO and Cluster, with Geotail (ISAS-Japan), Wind, and Polar — cooperates in education and public outreach by providing educational products, science data, and images that tell the story of the Sun. These materials (images) can be seen in most museums, planetariums, and science centers, and they support STSP's work with the general public. Images are also shown by national television broadcasting companies to share a solar event with the public when it happens.

**Lead:** Dr. Nicola Fox, Johns Hopkins Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099. E-mail: [foxnj1@jhuapl.edu](mailto:foxnj1@jhuapl.edu).

**URL:** <http://www-istp.gsfc.nasa.gov/istp/wind/wind.html>

**Activities:** "Live from the Aurora" and "Auroras: Living With a Star" [A274]  
"Passport to the Solar System" (PTSS) [A232]  
Science and Mathematics Achievement Through Research Training (Project SMART) [A306]  
"Science Concepts in Context" [A235]  
Student Observation Network (SON) [A319]  
Sun-Earth Connection (SEC) Classroom Visits [A321]  
Sun-Earth Day [A449]

**B112. Solar and Heliospheric Observatory (SOHO)**

**Description:** SOHO is designed to study the internal structure of the Sun, its extensive outer atmosphere, and the origin of the solar wind: the stream of highly ionized gas that blows continuously outward through the Solar System. SOHO is helping us to better understand the interactions between the Sun and Earth's environment. Its legacy



may enable scientists to solve some of the most perplexing riddles about the Sun, including the heating of the solar corona, the acceleration of the solar wind, and the physical conditions of the solar interior. It will give solar physicists their first long-term, uninterrupted view of the mysterious star that we call the Sun. The SOHO E/PO program generates and distributes materials on the Sun and SOHO for use in schools and by the public. The materials include posters, CDs, image sets, slide sets, stickers, and videos. Scientists give presentations in classrooms, at teacher workshops, in museums, and to other scientists. Materials are also provided to publications and news organizations.

Lead: Dr. Steele Hill, NASA Goddard Space Flight Center, Code 682.3, Greenbelt, MD 20771.  
E-mail: [steele.hill@gsfc.nasa.gov](mailto:steele.hill@gsfc.nasa.gov). Phone: 301-286-6452.

URL: <http://soho.nascom.nasa.gov>

Activities: "Live from the Aurora" and "Auroras: Living With a Star" [A274]  
NASA Connect: Having a Solar Blast [A293]  
National Society of Black Physicists Annual Convention [A72]  
"Passport to the Solar System" (PTSS) [A232]  
Science and Mathematics Achievement Through Research Training (Project SMART) [A306]  
"Science Concepts in Context" [A235]  
SOHO: Support for Educational Outreach [A420]  
"Space Weather Center" Traveling Exhibit [A19]  
Student Observation Network (SON) [A319]  
Sun-Earth Connections Educator Kit [A125]  
Sun-Earth Day [A449]  
Sun-Earth Day Workshop [A476]

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#### **B113. Coupled Ion Neutral Dynamics Investigation (CINDI)**

Description: The Coupled Ion-Neutral Dynamics Investigation (CINDI) is a NASA sponsored Mission of Opportunity conducted by the University of Texas at Dallas (UTD). CINDI will discover the role of ion-neutral interactions in the generation of small and large-scale electric fields in the Earth's upper atmosphere. Ion-neutral interactions are a key process in controlling the dynamics of all planetary atmospheres and their understanding is important to describing the electrodynamic connections between the Sun and the Upper Atmosphere.

URL: <http://129.110.7.63/heelis/cindi.html>

Activities: "In a Different Light" [A112]

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#### **B114. Living with a Star Program Office (LWS)**

Description: Living With a Star (LWS) is a NASA initiative that addresses aspects of the Sun-Earth system that affect life and society. This program is a part of the Sun-Earth Connection (SEC) theme within the Office of Space Science. The program elements are (1) a space weather research network, (2) theory, modeling, and data analysis programs, (3) space environment testbeds, and (4) established and expanded partnerships. The goals and objectives link to each of the six NASA Strategic Enterprises: Space Science, Earth Science, Human Exploration and Development of Space, Aerospace Technology, Biological and Physical Research, and Education.

Lead: Dr. Evelina Félicité-Maurice, NASA Goddard Space Flight Center, Code 460 Bldg 6 S141, Greenbelt, MD 20771.  
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URL: <http://lws.gsfc.nasa.gov>

Activities: "Live from the Aurora" and "Auroras: Living With a Star" [A274]  
Living With a Star (LWS): Inservice Teachers Workshop [A171]  
Living With a Star (LWS): Master Teacher Leadership and Mentor Program [A172]  
Living With a Star (LWS): Preservice Workshop [A173]  
LWS Follow-up Program and School Visits [A276]  
LWS Information Technology Program [A230]  
LWS Student Internship [A277]  
"Our Star the Sun": Summer Institute [A186]  
"Passport to the Solar System" (PTSS) [A232]  
"Science Concepts in Context" [A235]  
Sun-Earth Connections Educator Kit [A125]  
Sun-Earth Day [A449]  
Sun-Earth Day Workshop [A476]  
Teacher Workshops on Planet Finding [A207]

**B115. Solar Dynamics Observatory (SDO)**

**Description:** The Solar Dynamics Observatory (SDO) project is the first of the Living With a Star (LWS) programs under the Sun-Earth Connection (SEC) theme at NASA. The project goals are to understand the solar variations that influence life on Earth and humanity's technological systems by determining: (1) How the Sun's magnetic field is generated and structured; and (2) how this stored energy is converted and released into the heliosphere and geospace in the form of solar wind, energetic particles, and variations in the solar irradiance. The SDO E/PO program will focus primarily on informal education and public outreach efforts that share NASA's vision to "inspire the next generation of explorers, as only NASA can", promote science literacy and raise public awareness of the SEC theme, with emphasis on SDO research and discoveries.

**Lead:** Ms. Emilie Drobnes, NASA Goddard Space Flight Center, Code 682.3, Greenbelt, MD 20771. E-mail: [Emilie@ihy.gsfc.nasa.gov](mailto:Emilie@ihy.gsfc.nasa.gov). Phone: 301-286-3146.

**URL:** <http://sdo.gsfc.nasa.gov>

**Activities:** SDO: Dynamic Sun Workshops [A471]  
SDO: Internships for Students [A307]  
SDO: Public Speaking Engagements and Classroom Visits [A308]

**B116. Space Technology-5 (New Millennium) (ST-5)**

**Description:** The Space Place has involved ST-5 in various events/activities. We attend conferences to promote Space Place and all of the projects involved with the Web site. Usually, mission- or Space Place-related items are passed out. Libraries, science museums, planetariums, zoos and aquariums across the United States have formed "Club Space Place" partnerships with NASA. They get Space Place-provided display materials, an activity guide, and handouts for an original group activity. Through these partnerships we promote the Space Place Web site and NASA missions. Club Space Place provides quarterly interdisciplinary hands-on activities that are space or Earth science related. These quarterly activities go to the Space Place library and museum partners, Boys & Girls Clubs of America, YWCA, and the Civil Air Patrol. Presently there are 272 partners reaching thousands of children. On a monthly basis, Space Place provides articles for over 20 newspapers nationwide in both English and Spanish. The combined readership of these newspapers adds up to more than 2.5 million. The articles always end with information on activities and a link to the Space Place Web site and OSS mission Web sites. Diane Fisher submits articles to "Technology and Children" magazine four times a year, and articles to "The Technology Teacher" magazine eight times a year. Each article, published under the Space Place header, refers to a particular mission. Each "Technology and Children" publication reaches an estimated 1,400 teachers and their students (possibly 42,000 children), and each "The Technology Teacher" publication reaches an estimated 8,000 teachers and their students (possibly 224,000 children). Each article is also posted on ITEA's Web site, which reaches an even wider audience. The Space Place Web site is a dynamic site that offers interactive experiences and fun facts for children and adults. The Space Place is supported by the New Millennium Program. It reaches an average of 3,000 web users per day.

**Lead:** Ms. Nancy Leon, NASA Jet Propulsion Laboratory, M/S 171-350, 4800 Oak Grove Drive, Pasadena, CA 91109. E-mail: [Nancy.J.Leon@jpl.nasa.gov](mailto:Nancy.J.Leon@jpl.nasa.gov). Phone: 818-354-1067.

**URL:** <http://spaceplace.nasa.gov>

**Activities:** Club Space Place Activities [A351]  
Space Place: International Technology Education Association Journal [A430]  
The Space Place Web Site [A453]

## International Missions with NASA Participation

**B117. Yohkoh**

**Description:** Yohkoh, an observatory for studying x-rays and gamma rays from the Sun, is a project of the Institute for Space and Astronautical Sciences, Japan. The spacecraft was built in Japan, but contributions to the observing instruments were made by the United States and Great Britain. Yohkoh was launched in August 1991; the spacecraft lost attitude control in December 2001, and recovery attempts have been unsuccessful.

**URL:** <http://www.lmsal.com/SXT>

**Activities:** "Live from the Aurora" and "Auroras: Living With a Star" [A274]  
"Passport to the Solar System" (PTSS) [A232]  
"Science Concepts in Context" [A235]

